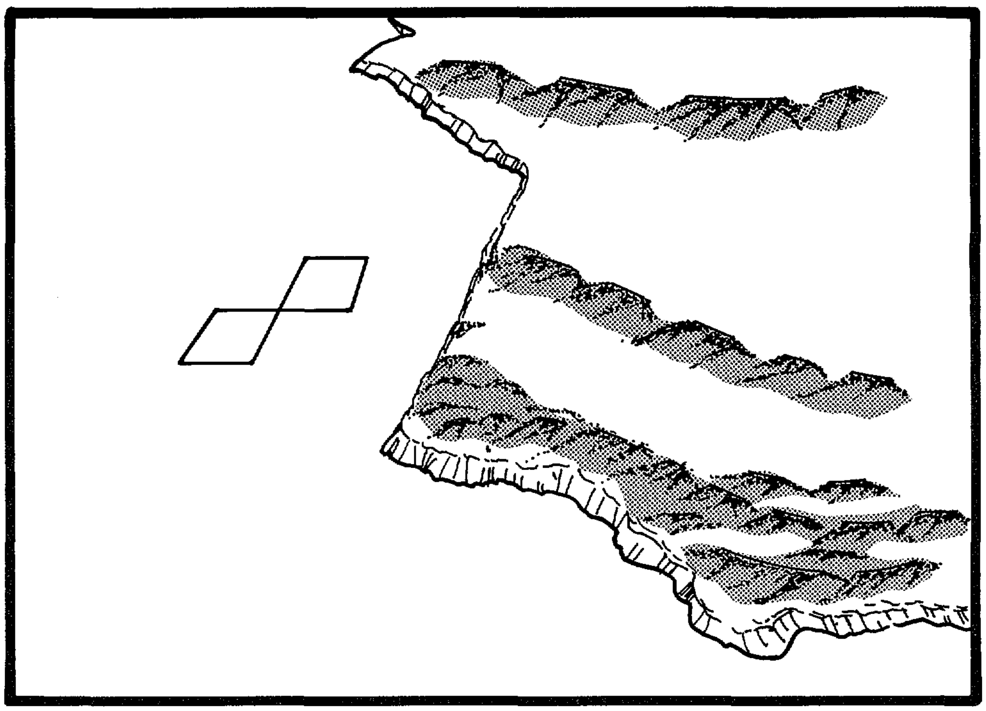
OIL SPILL CONTINGENCY PLAN

POINT PEDERNALES FIELD
OCS P-0438 and P-0440



EXXON COMPANY, U.S.A.

PRODUCTION DEPARTMENT
WESTERN DIVISION

1. INTRODUCTION
TABLE OF CONTENTS

TABLE OF CONTENTS

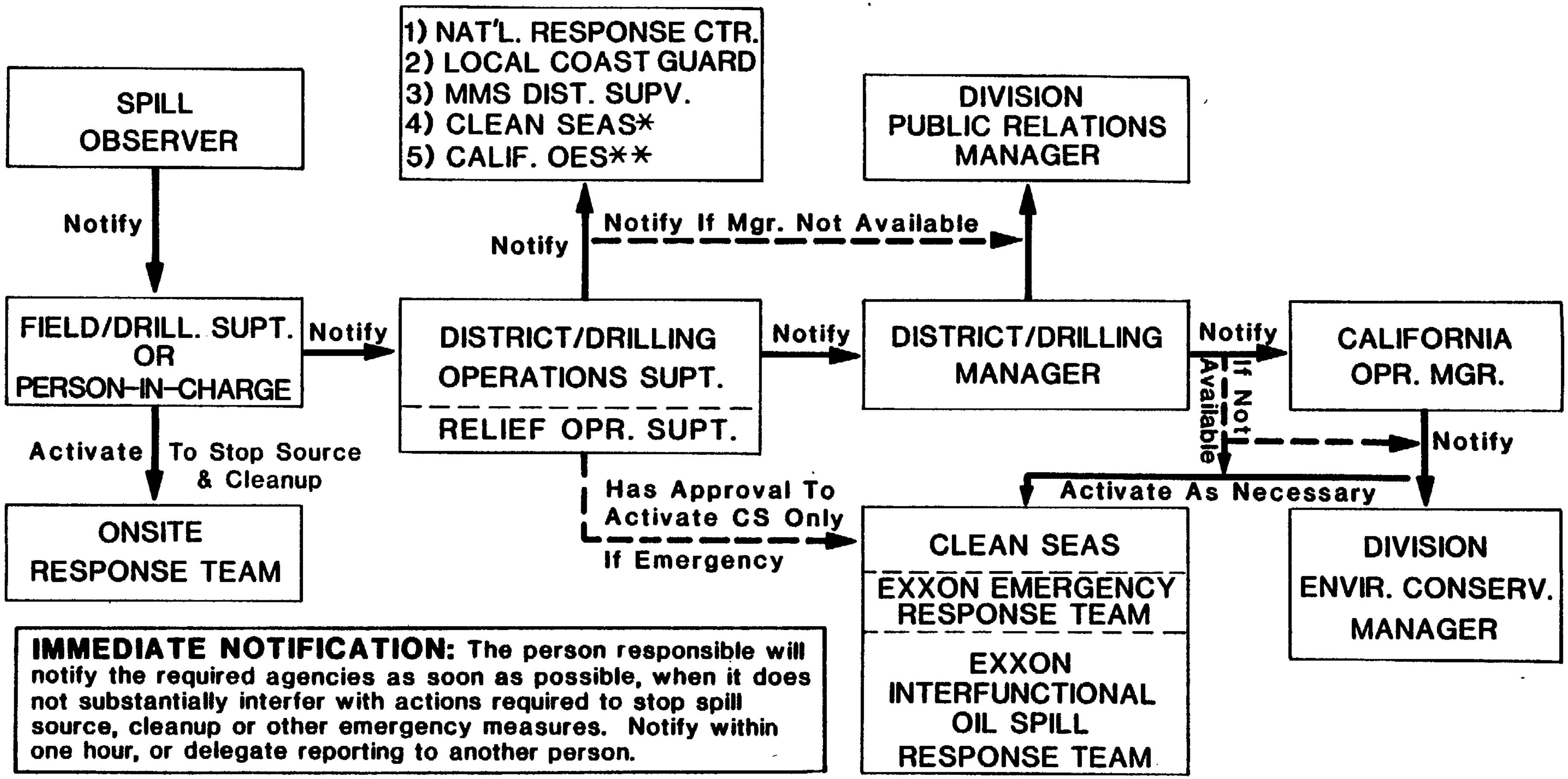
Section

INTRODUCTION

The objective of this contingency plan is to establish procedure, responsibilities and actions to be taken in the event of an oil spill from our Point Pedernales facilities. Our uppermost concern is the safety of lives and the prevention of damage to property and the environment. This plan provides guidance beginning from the oil spill discovery and notifications on through the cleanup and disposal stages. Outlined are provisions for varying response efforts for open ocean containment and cleanup and shoreline cleanup. The plan also contains risk and trajectory analyses for the platform and proposed pipelines.

Coastal areas from San Luis Bay to Point Conception including the Channel Island, are segmented and identified for their specific type; i.e. rocky, sandy beaches, recreational, wetlands, biological sensitivity, and wildlife habitats. Each type of coastal area has a general and site-specific plan of response in the event it is impacted by an oil spill. The equipment required, its availability and response time to various sensitive areas and the method of deployment are also addressed in this plan.

83/576



IMMEDIATE NOTIFICATION: The person responsible will notify the required agencies as soon as possible, when it does not substantially interfer with actions required to stop spill source, cleanup or other emergency measures. Notify within one hour, or delegate reporting to another person.

TELEPHONE NUMBERS		REQUIRED TIMING
NRC	(800) 424-8802	Immediately Or Local USCG
USCG	(805) 962-7430	Immediately
MMS	(805) 648-5131	Immediately If >1 cu. me. ,12 Hrs. If <1 cu. me. (1 cu. meter = 6.3 bbl. or 265 gal.)
Clean Seas*	(805) 965-6502	Immediate If Help Required, Notify To Standby If Containment & Recovery By Exxon Is Uncertain
Calif. OES**	(800) 852-7550	Immed. If Spill Threatens Or Enters State Waters

EXXON COMPANY, U.S.A.

FIGURE 200-1

OFFSHORE SPILL NOTIFICATIONS (OCS)
SANTA BARBARA CHANNEL
SANTA MARIA BASIN

Rev. Oct. 1983

OFFSHORE NOTIFICATION LIST

Titles, names and telephone numbers for Exxon personnel, government agencies and oil spill cooperatives.

Exxon Personnel	Telephone Number	
Offshore District Operations Superintendent M.F. Rogers	(805)654-6832	(805)967-6580
District Manager L.M. Smedley	(805)654-6833	(805)493-1173
Division Operations Manager B.L. Boyd	(805)494-2352	(805)497-7146
Division Environmental Conservation Manager D.E. Cornett	(805)494-2355	(805)497-4227
Division Public Relations Manager D I Bolding	(805)494-2415	(213)762-2811

Government Agencies

National Response Center (NRC)	(800)424-8802
U.S. Coast Guard (USCG)	
Santa Barbara Area	(805)962-7430
Long Beach Area	(213)590-2315
Minerals Management Service (MMS) OCS spill only	
Ventura District Supervisor (written report - 145 N. Brent St., Suite 202 Ventura, CA 93003)	(805)648-5131
California Office of Emergency Services (OES)	(800)852-7550
State Lands Commission (SLC) District Supv. (If spill occurs from Belmont Island) (written report - 245 W. Broadway, Suite 475 Long Beach, CA 90802)	(714)536-3018 or (213)590-5201

Oil Spill Cooperatives

Clean Seas (Santa Barbara/Santa Maria)	(805)965-6502
CCW (L.A., Long Beach areas)	(213)432-1415

Revised January, 1984

200 NOTIFICATIONS

Notification procedures for oil spills resulting from production or exploration operations have been devised to follow a logical sequence for timely notification to ensure compliance with federal and state regulations. This sequence of notifications is illustrated on figures 200-1, 2 and 3 for both offshore and onshore operations. Although the notification sequence has been established by Exxon, the notification timing is determined by federal and state regulations.

It is essential that all notifications are made as timely as possible to ensure compliance with the law as well as provide protection for life, property and the environment. To notify "immediately" means as soon as practical and a one hour maximum time limit has been established to allow for initiating action to stop the spill source and investigate the situation for reporting. The Field/Drilling Superintendent may delegate the notification responsibility to another person if it detracts from his involvement in the corrective action being taken. The following information will be required by the District/Drilling Operations Superintendent.

- Location, volume, time and cause of spill
- Injuries, hazardous to life, property or environment
- Did spill enter navigable waters
- Is spill threatening to enter navigable waters
- Does spill pose a threat to public health or welfare, aquatic life or public or private property
- Is help required to contain and/or recover the spill

In the event outside help is required to contain and/or recover a spill from offshore operations, the California Operations Manager is designated as the person to approve callout of the spill co-op and any other additional help. However, the notification and approval sequence provides for the delegation of approval authority to others in the event of an extreme emergency or when the next level of authority is unavailable. When the normal notification sequence is re-established, approval authority will revert to those normally holding that authority.

Federal and State Notification Requirements

The Federal Water Pollution Control Act, commonly referred to as the Clean Water Act is the basis for all pollution control to maintain the biological integrity of the Nation's waters. The Act is administered by the EPA and the U.S. Coast Guard. The EPA administers the provisions of the Act when it concerns inland navigable waters and the Coast Guard administers the provisions of the Act as they apply to navigable coastal waters and OCS waters including the shoreline.

Section 311(b)(5) of the Act requires:
Any person in charge of a vessel or of an onshore facility or offshore facility shall, as soon as he has knowledge of any discharge of oil or hazardous substance from such vessel or facility, immediately notify the appropriate agency of the U.S. government.

33 CFR 153.203 (U.S. Coast Guard)
Notify as described in 311(b)(5) except: "immediately notify by telephone, radio communication or a similar means of rapid communication the duty Officer, National Response Center 800-424-8802 or if that is impractical, then notify the 1) Regional On-Scene-Coordinator, 2) Commanding Officer or Officer-in-Charge of the nearest Coast Guard unit in the vicinity of the discharge or, 3) Commander of the Coast Guard district in the vicinity of the discharge.

Pacific OCS Order 7 (MMS)

2.3 Pollution Reports. All spills of oil and liquid pollutants shall be reported orally to the District Supervisor and shall be confirmed in writing. All reports shall include the cause, location, volume of spill, and action taken. Reports of spills of more than 5.0 cubic meters (31.5 barrels) shall include information on the sea state, meteorological conditions, size, and appearance of slick. All spills of oil and liquid pollutants shall also be reported in accordance with the procedure contained in 33 CFR 153.203.

2.3.1 Spills. Spills shall be reported orally within the following time limits:

a. Within 12 hours, if spills are 1.0 cubic meter (6.3 barrels) or less:

b. Without delay, if spills are more than 1.0 cubic meter (6.3 barrels).

California State Lands Commission (SLC)

2142 Pollution Reports

(a) All spills or leakage of oil and liquid pollutants originating from operations on State oil and gas leases shall be reported orally without delay to the United States Coast Guard and to the State Office of Emergency Services in Sacramento. Subsequent to oral notification, a written report shall be filed with the State Lands Commissions, stating the source, cause, size of spill and the action taken.

(b) Lessees shall report orally to the three authorities indicated in Section 2142 (a) any pollution of unknown source or pollution unassociated with lease operations that is observed on or in State waters.

(c) Lessees shall notify one another of information regarding equipment malfunction or of information regarding pollution resulting from another's operation.

California Water Code - Section 13272 (Sept. 28, 1982)

(a) Except as provided by subdivision (b), any person who, without regard to intent or negligence, causes or permits any oil or petroleum product to be discharged in or on any waters of the state, or discharged or deposited where it is, or probably will be, discharged in or on any waters of the state, shall, as soon as (1) such person has knowledge of the discharge, (2) notification is possible, and (3) notification can be provided without substantially impeding cleanup or other emergency measures, immediately notify the Office of Emergency Services of the discharge in accordance with the spill reporting provision of the state oil spill contingency plan.

(b) The notification required by this section shall not apply to a discharge in compliance with waste discharge requirements or other provisions of this division.

(c) Any person who fails to provide the notice required by this section is guilty of a misdemeanor and shall be punished by a fine of not less than five hundred dollars ($500) or more than five thousand dollars ($5,000) per day for each day of failure to notify, or imprisonment of not more than one year, or both. Except where a discharge to the waters of this state would have occurred but for cleanup or emergency response by a public agency, this subdivision shall not apply to any discharge to land which does not result in a discharge to the waters of this state. This subdivision shall not apply to any person who is fined by the federal government for a failure to report a discharge of oil.

(d) Notification received pursuant to this section or information obtained by use of such notification shall not be used against any person providing the notification in any criminal case, except in a prosecution for perjury or giving a false statement.

(e) Immediate notification of an appropriate agency of the federal government of the discharge shall constitute compliance with the requirements of subdivision (a).

(f) Immediate notification of the appropriate regional board of the discharge, in accordance with reporting requirements set under Section 13267 or 13383, shall constitute compliance with the requirements of subdivision (a).

(g) The reportable quantity for oil or petroleum products shall be one barrel (42 gallons) or more, by direct discharge to the receiving waters, unless a more restrictive reporting standard for a particular body of water is adopted subsequent to January 1, 1983.

State - Oil Spill Contingency Plan (revised May 1983)

510. Phase I - Discovery and Notification

Upon discovery of a reportable oil discharge by the vehicle or facility operator, a member of the public, or a government agency, notification must be made to the state Office of Emergency Services (OES) and to the federal National Response Center (NRC). OES and the NRC both maintain 24-hour toll free numbers:

OES (800) 852-7550
NRC (800) 424-8802

Reportable Quantities

There are various agencies' regulations that define the amount and type of substance that when discharged must be reported. The most stringent of these regulations is the EPA's definition in 40 CFR 110.3 which interprets section 311 (b) of the Clean Water Act. This regulation defines the reportable discharge quantities of oil as:

> The discharges of such quantities of oil into or upon the navigable waters of the United States or adjoining shorelines determined to be harmful to the public health or welfare of the United States, at all times and locations and under all circumstances and conditions, including discharges which:
>
> (a) Violate applicable water quality standards, or

(b) Cause a film or sheen upon or discoloration of the surface of the water or adjoining shorelines, or cause a sludge or emulsion to be deposited beneath the surface of the water or upon the adjoining shorelines.

Therefore, any discharge of oil that enters or threatens to enter the navigable waters of the United States which includes streams, rivers, storm drains, water sheds that may enter navigable waters, harbors or the ocean must be reported to the appropriate government agencies.

4. ORGANIZATION AND TRAINING

OFFSHORE SPILL RESPONSE

The primary objective of offshore spill response is the safety of personal life, preservation of property and prompt control to minimize adverse effects on the environment. Awareness, preparation, and proper training are the foremost qualities in making a rapid, effective response in case of a spill.

Figure 301-1 Sequence of Spill Response Actions, Figure 301-2 Oil Spill Response, and the sections on Decision Guides, and checklists set out the actions and sequence required for response in the event of a spill. individual, team, and group job responsibilities are outlined in section 400.

For the purpose of this section, spills are defined in two categories:

Small Spill: Any spill which can be contained and recovered by the Onsite Response Team, (ORT) without the aid of outside assistance. This would be a spill of no more than 20 barrels in moderate weather and sea state that would not pose serious danger to the ORT during their response to the spill.

Large Spill: Any spill too large or the weather and sea conditions are such that the Onsite Response Team requires outside assistance to contain and recover the oil spill.

Assessment and Action Initiation

The Site Superintendent is charged with making the Primary and Secondary spill assessments. Since these assessments will not only determine the actions taken at the spill site, but will also, in part, determine the necessity for Secondary Response Phase measures, evaluation must be made with care. The preliminary evaluation may be complicated by any unique circumstances of the spill. The following guidelines are suggested to help the Site Superintendent make his assessment in an orderly manner.

Response Assessment Guide

- Evaluate the spill by considering the following:
  - hazards posed by the spill to personnel and site, and necessity for shutdown of operations
- Spill Size
- Is spill stopped or continuous
  - hazardous to Onsite Response Team
  - causing spill movement toward or away from shore
- Ability of Onsite Response Team to contain spill
- Proximity of available assistance
- General shoreline areas threatened
- Activate appropriate spill response action (Figure 301-1 pg. 300-2)

PHASE	ACTION	PERSON(S) RESPONSIBLE
DISCOVERY	Detection	first persons to sight spill
	Shutdown	personnel on-scene
PRIMARY RESPONSE	Preliminary assessment of spill and action initiation	Site Superintendent
	Activation of Onsite Response Team and Onsite Support Group	Site Superintendent
	Notification of: Operations Superintendent	Site Superintendent
	Government Agencies District Manager	Operations Supt.
	California Operations Mgr.	District Manager
	Additional Government Agencies as required	Operations Supt.
SECONDARY RESPONSE (large spills)		
	Secondary assessment and spill progress report to Operations Superintendent	Site Superintendent
	Activation of spill cooperative(s)	Operations Manager
	Activation of Emergency Response Team	Operations Manager

Figure 301-1. SEQUENCE OF SPILL RESPONSE ACTIONS

OIL SPILL RESPONSE

INITIAL RESPONSE

ONSITE RESPONSE TEAM

ONSITE SUPPORT GROUP

BACKUP SUPPORT

EMERGENCY RESPONSE TEAM (DIV. & DIST. PERSON.)

COORDINATOR

DIV. OPR. MGR.

FIELD OPERATIONS

DRILLING
CLEANUP MGR.
ONSHORE OPR.
MARINE OPR.
ASSESSMENT SUPV.
WASTE DISPOSAL

ADMINISTRATIVE

LOGISTICS
COMMUNICATIONS
ACCOUNTING/CLAIMS

FUNCTIONAL STAFF

P.R., LAW, SECURITY
SAFETY, TRAINING

OIL SPILL COOPERATIVES

CLEAN SEAS
CCW
(LARGE STATE OF THE ART EQUIPMENT)

CONTRACTORS

TUG BOATS
BARGES
HEAVY EQUIP.
TRUCKS
MAN POWER

EXXON INTERFUNCTIONAL RESPONSE TEAM

ADVISORY/SPECIAL
CLEANUP
DISPOSAL
CHEMICALS
ECOLOGICAL
RELIEF PERSONNEL

GOVERNMENT AGENCIES

COAST GUARD
STRIKE TEAM
STATE OPR. TEAM
FISH & GAME
U.S. FISH & WILDLIFE
NATL. MARINE FISHERIES SER.
POLICE
FIRE

Figure 301-2.

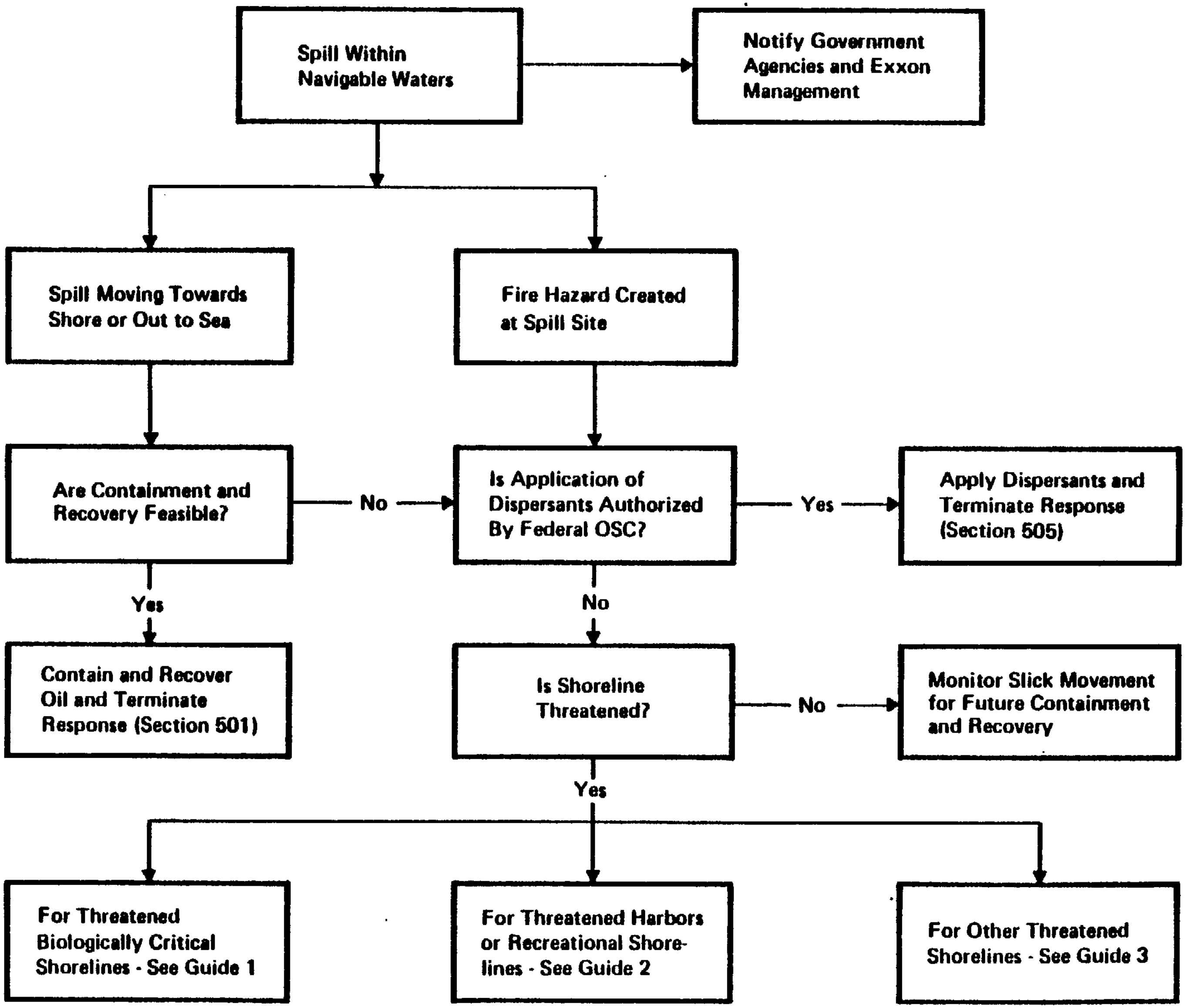


Figure 302-1. OFFSHORE RESPONSE PLANNING GUIDE

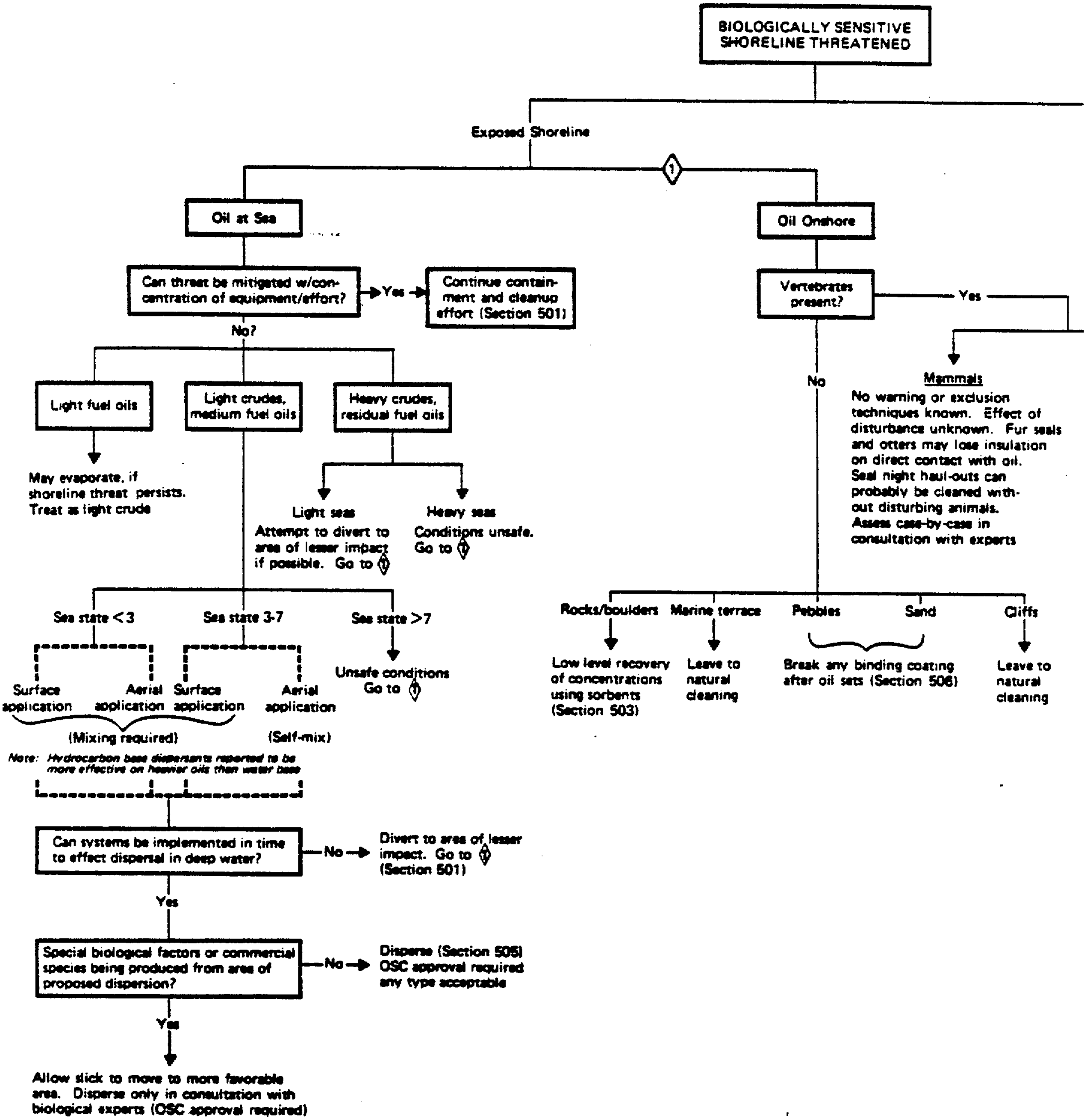
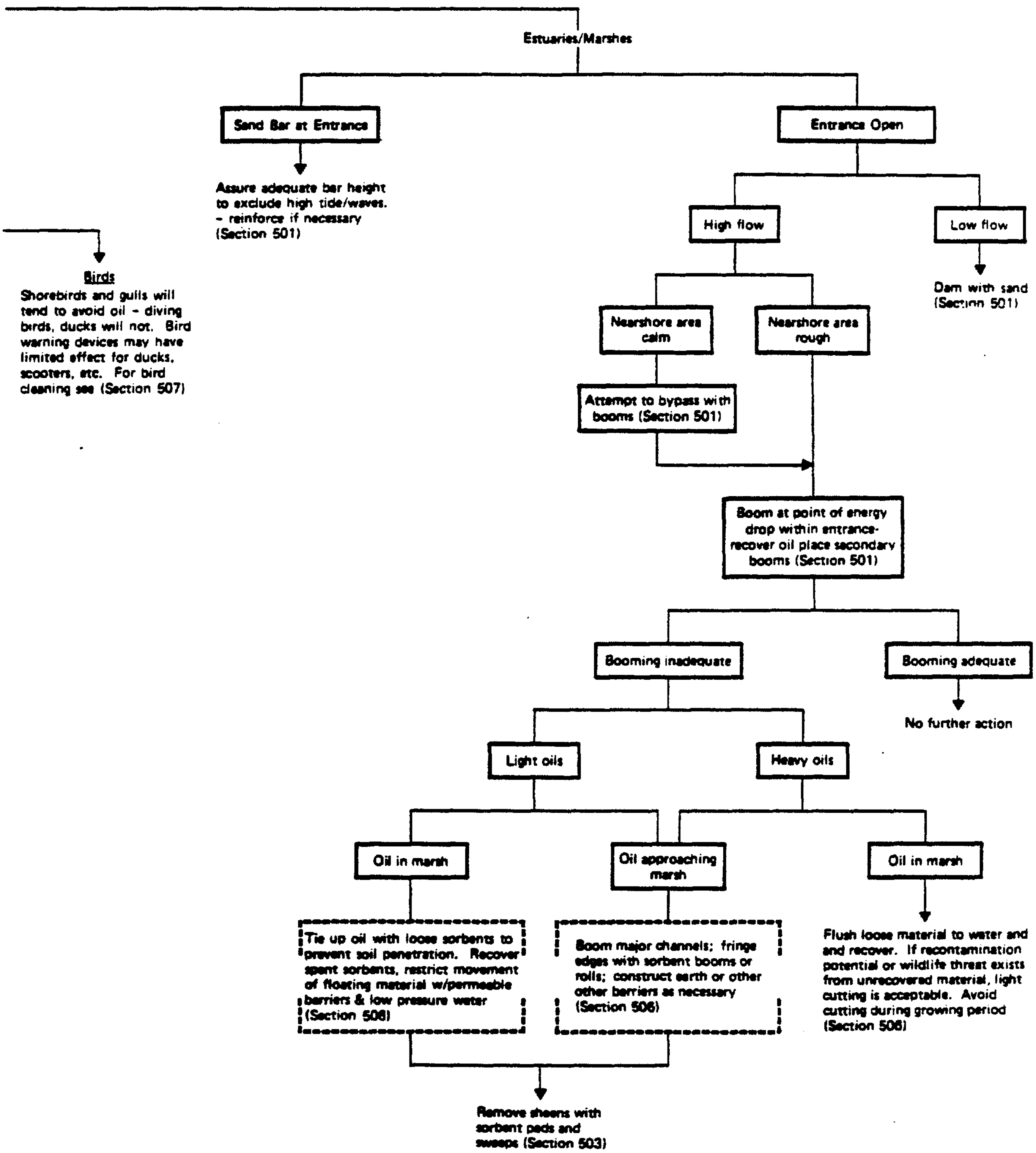


Figure 302-2. RESPONSE GUIDE 1
BIOLOGICALLY SENSITIVE SHORELINE


Estuaries/Marshes
Sand Bar at Entrance
Assure adequate bar height to exclude high tide/waves. - reinforce if necessary (Section 501)
Entrance Open
High flow
Low flow
Dam with sand (Section 501)
Birds
Shorebirds and gulls will tend to avoid oil - diving birds, ducks will not. Bird warning devices may have limited effect for ducks, scooters, etc. For bird cleaning see (Section 507)
Nearshore area calm
Nearshore area rough
Attempt to bypass with booms (Section 501)
Boom at point of energy drop within entrance-recover oil place secondary booms (Section 501)
Booming inadequate
Booming adequate
No further action
Light oils
Heavy oils
Oil in marsh
Oil approaching marsh
Oil in marsh
Tie up oil with loose sorbents to prevent soil penetration. Recover spent sorbents, restrict movement of floating material w/permeable barriers & low pressure water (Section 506)
Boom major channels; fringe edges with sorbent booms or rolls; construct earth or other other barriers as necessary (Section 506)
Flush loose material to water and and recover. If recontamination potential or wildlife threat exists from unrecovered material, light cutting is acceptable. Avoid cutting during growing period (Section 506)
Remove sheens with sorbent pads and sweeps (Section 503)

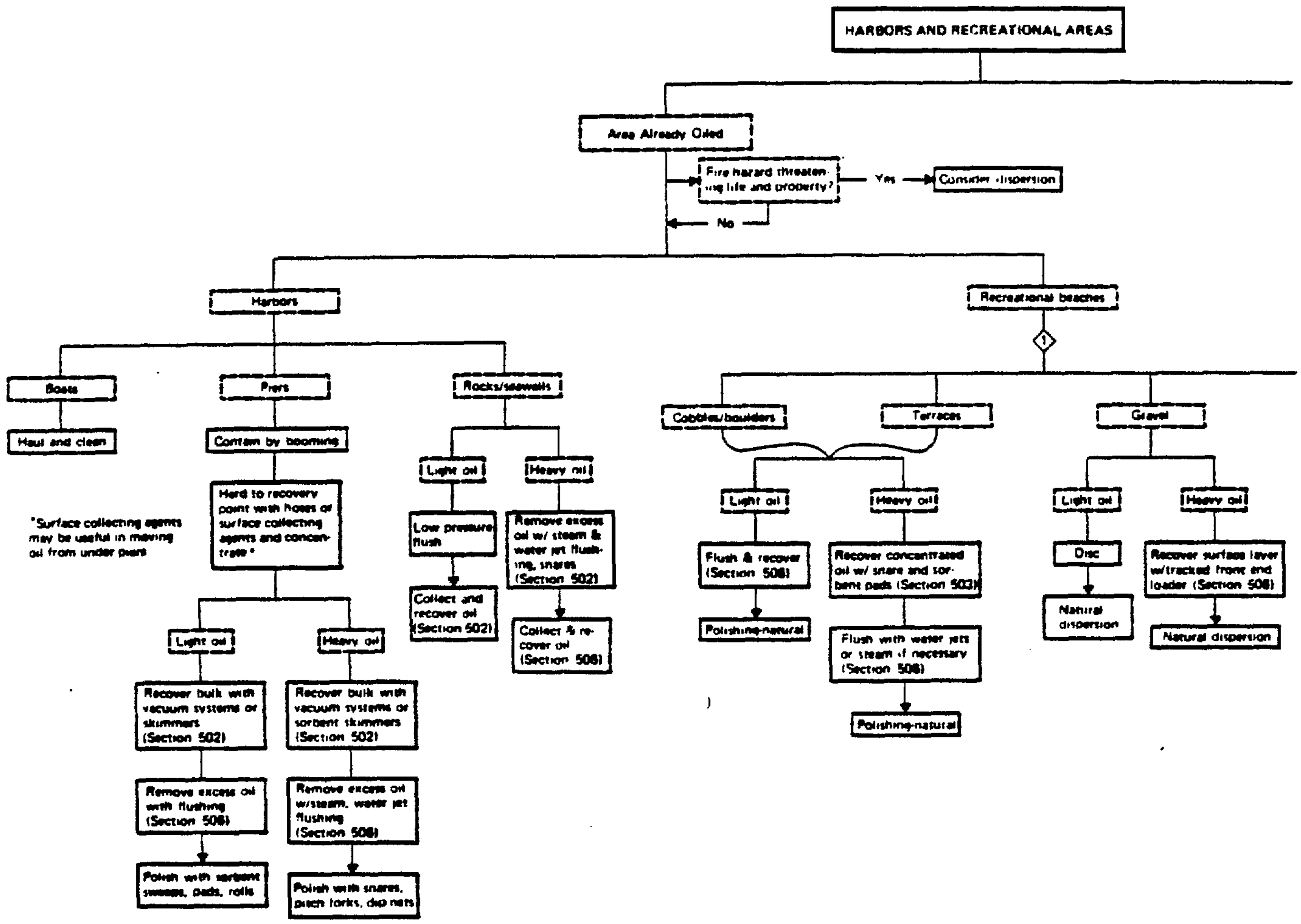
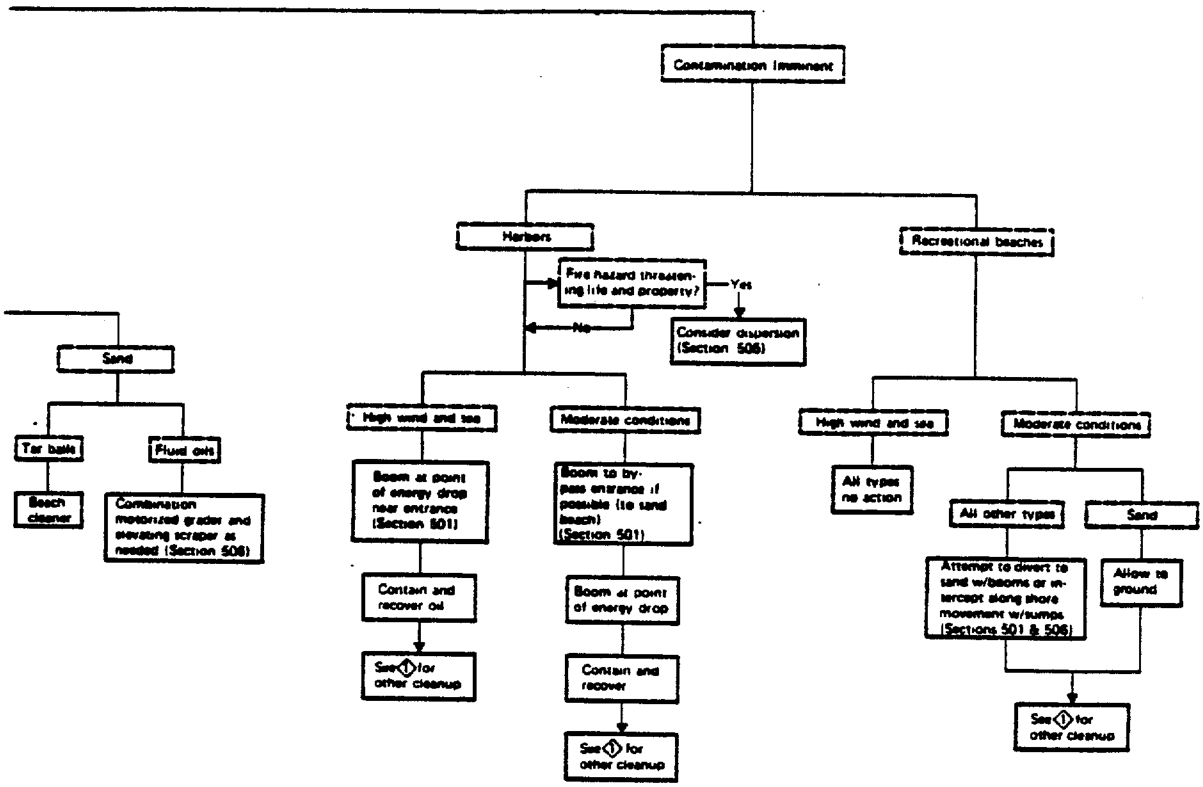


Figure 302-3. RESPONSE GUIDE 2
HARBORS AND RECREATIONAL AREAS


Contamination Imminent
Harbors
Fire hazard threatening life and property?
Yes
No
Consider dispersion (Section 506)
High wind and sea
Boom at point of energy drop near entrance (Section 501)
Contain and recover oil
See 1 for other cleanup
Moderate conditions
Boom to by-pass entrance if possible (to sand beach) (Section 501)
Boom at point of energy drop
Contain and recover
See 1 for other cleanup
Recreational beaches
High wind and sea
All types no action
Moderate conditions
All other types
Attempt to divert to sand w/booms or intercept along shore movement w/sumps (Sections 501 & 506)
Sand
Allow to ground
See 1 for other cleanup
Sand
Tar balls
Beach cleaner
Fluid oils
Combination motorized grader and elevating scraper as needed (Section 506)

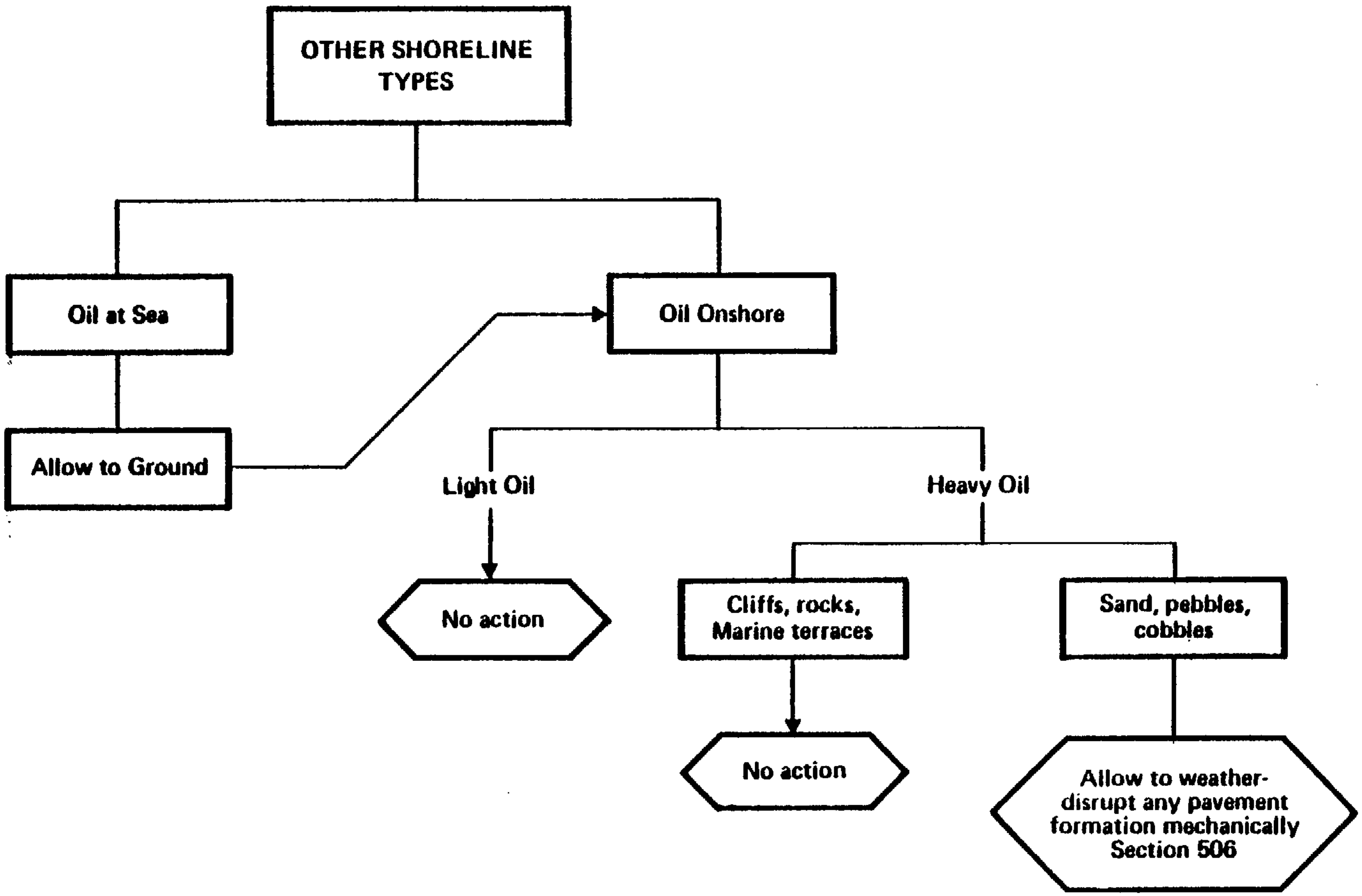


Figure 302-4. RESPONSE GUIDE 3 TO OTHER SHORELINE TYPES

OFFSHORE
SMALL SPILL CHECKLIST

(1-20 barrels, Assume Onsite Response Team Can Handle)

Person Responsible	Action to be Taken as Quickly as Possible
Person sighting spill	Notify Site Superintendent (person in charge) REPORT: • Location of spill (in relation to facility) • Type of fluid (diesel, crude, other) • Size (estimate dimension or volume on water) • Direction of spread (away from or confined around facility) • If known, is source shut-in or continuing • After reporting, verify spill source is shut-in, obtain assistance if required. • IF SPILL IS SOUR CRUDE DO NOT ENTER SOURCE AREA ALONE, WEAR AIR PACK
Site Superintendent (Person-in-Charge)	• Alert all personnel of spill • Instruct Onsite Response Team to prepare and stand by • Determine danger to personnel, facility and feasibility of deploying containment equipment (danger includes: toxicity, flammability, weather and sea conditions and visibility) • Notify Operations Superintendent
Operations Superintendent	• Notify required government agencies
Site Superintendent	• If safe and feasible, activate ORT and deploy spill containment boom • Assess ORT progress - If spill contained, proceed to clean up - If spill uncontained, notify management, spill cooperative assistance required
Operations Manager	• Activate spill cooperative for assistance • Notify Public Relations Manager • Alert Emergency Response Team members

***If spill is sour crude, use procedure from Page 300-13

OFFSHORE
LARGE SPILL CHECKLIST
(Greater Than Onsite Response Team Can Handle)

Person Responsible	Action to be Taken as Quickly as Possible
Person sighting spill	Notify Site Superintendent (person in charge) REPORT: • Location of spill (in relation to facility) • Type of fluid (diesel, crude, other) • Size (estimate dimension or volume) • Direction of spread (away from or confined around facility) • If known, is source shut-in or continuing • After reporting, verify spill source is shut-in, obtain assistance if required. • IF SPILL IS SOUR CRUDE DO NOT ENTER SOURCE AREA ALONE, WEAR AIR PACK
Site Superintendent (Person-in-Charge)	• Alert all personnel of spill • Instruct Onsite Response Team to prepare and stand by • Determine danger to personnel, facility and feasibility of deploying containment equipment (danger includes: toxicity, flammability, weather and sea conditions and visibility) • Notify Operations Superintendent
Operations Superintendent	• Notify Exxon management and government agencies • Advise Operations Manager that spill cooperative assistance is needed • Advise if spill is hazardous and arrange for removal of nonessential personnel
ORT	• Deploy spill containment boom when safe and try to contain leading or shoreward edge of slick
Site Superintendent	• Reassess spill and evaluate ORT progress
Operations Manager or Designated Representative	Secondary Response Phase • Activate CS or SC-PCO/CCW. If necessary, activate all or portions of the Emergency Team (ERT) • Ensure support for removal of nonessential personnel.

SAFETY PROCEDURES FOR A HIGH SULFUR CRUDE SPILL

Platform

- If the spill is on the water beneath platform or crude is still being emitted into the sea, the Onsite Response Team is not to enter the plus 15 foot level until the H_2S concentration is determined first.
- Monitoring is to be done with a reliable measuring device - direct reading H_2S meter or Drager tube.
- H_2S measurement should always involve two persons, one measures and the other is positioned for safety watch.
- Portable breathing air sets are to be worn by each of the persons involved in the monitoring.
- For personal safety, the concentration of H_2S must be monitored by instrument and not judged by the degree of odor, as the ability to smell H_2S is lost at approximately 70 ppm after brief exposure.
- Measurement should be taken on the downwind side of the platform or of the spill surface.
- If the spill slick has moved away from the platform and is visible the Boston Whaler should be deployed and approach the slick from upwind with caution. If H_2S odor is detected, put on air packs.
- Portable breathing sets and means of radio communication are to be taken with personnel on Boston Whaler.
- Maintain radio contact with the platform at all times.
- When the H_2S concentration of the slick is determined by instrument to be below the exposure limit of 10 ppm, return to the platform and deploy the spill boom for containment.
- Although the exposure limit of toxic substance to the clean-up team will be low, air packs should be available for each member.
- The toxic and volatile fractions from raw high sulfur crude will be at its highest rate if the wind is low and the sea is calm. The greater the agitation from the wind and sea, the quicker the dispersion of the toxic substances.

RESPONSE TIME FOR CLEAN SEAS EQUIPMENT TO SELECTED LOCATIONS

Location Requiring Response	Location of Nearest Responding Equipment	Approximate Distance between Storage and Response Site (Miles)	Total Response Time (Hours)*
Shamrock Platform	Shamrock Platform	0	0.5
	Port San Luis (Mr. Clean II)	42	5.0
	Santa Barbara Harbor (Mr. Clean I)	70	7.5
Deer Canyon	Avila Beach (Vans #3 and 10)	8	2-3
Point San Luis	Avila Beach (Vans #3 and 10)	5	1.5-2.5
Avila Beach	Avila Beach (Vans #3 and 10)	0	1.5-2.5
Pismo Beach	Avila Beach (Vans #3 and 10)	5	2-3
Grover City	Avila Beach (Vans #3 and 10)	8	2-3
Santa Maria River Mouth	Avila Beach (Vans #3 and 10)	30	2.5-3.5
Lion Rock	Avila Beach (Vans #3 and 10)	33	2.5-3.5
Point Sal	Avila Beach (Vans #3 and 10)	33	2.5-3.5
Purisima Point	Gaviota (Van #2)	40	3-4
Santa Ynez River Mouth	Gaviota (Van #2)	31	2.5-3.5
Point Pedernales	Gaviota (Van #2)	35	3-4
Point Conception	Gaviota (Van #2)	16	2-3

* Includes mobilization (1 hour for vessels; 1-2 hours for vans), travel time (@ 10-12 knots at sea and 30 mph on land), and deployment time (30 minutes).

The persistence of oil in an area is used as a measure of the sensitivity of the area to an oil spill. Oil generally does not persist in exposed, sandy beach and rocky coastline areas because it is rapidly dissipated by wave action or tidal flushing. Shoreline areas most vulnerable to oil include sheltered coastline areas and salt marshes. In these areas, wave action and tidal flushing are not strong and oil would persist for a relatively long period of time.

Most of the coastline adjacent to the Santa Maria Basin and Santa Barbara Channel OCS areas is composed of exposed shoreline areas subject to high energy wave action and tidal flushing. There are, however, some sheltered areas bordering the Basin and Channel where oil could persist for longer periods of time (Woodward-Clyde, 1980).

General Response Strategies

Three major shoreline types are found adjacent to the Santa Maria Basin and Santa Barbara Channel areas.

Rocky Shoreline Areas: Most of the rocky shoreline areas are exposed to high energy wave action and tidal flushing and probably would experience rapid rates of natural cleaning. Along very steep shores, most oil would be held offshore by reflected waves and any oil deposited would be rapidly removed. On less steep shores, the upper intertidal and supralittoral zones would be oiled, and might take up to 6 to 9 months for natural removal. On wave-cut platforms, short-term persistence of oil would occur along the upper intertidal sediments (Gundlach et. al., 1982).

Sandy Beaches: Sandy beach areas have a low to moderate sensitivity to oil. The compact sediments of fine-grained sandy beaches would prevent the deep oil penetration which may be expected where the beach is composed of coarse-grained sediments (Gundlach et al., 1981). Small accumulations of oil would be deposited primarily along high-tide swashlines, while larger accumulations could cover the entire face of the beach.

Sheltered Wetlands: Shoreline areas most vulnerable to oil are sheltered wetlands. Oil could persist in these areas for five to ten years; marsh plants, epifauna and infauna would be adversely affected (Gundlach et all, 1982). The principal technique for protecting such areas is to enhance, by mechanical means, the existing sand bars at outlets to the ocean or to use exclusionary booming techniques.

If a major spill cannot be contained and cleaned up at sea, and is likely to contact a shoreline area the following procedures will be followed:

1) Using this Oil Spill Contingency Plan, and the assistance of the MMS, U.S. Coast Guard, and other supporting organizations, the sensitivity of the shoreline areas will be determined.

2) Initial response efforts will be directed toward protection of sheltered wetlands, sensitive habitat areas, and harbor facilities. The response strategies discussed in this oil spill plan, the sea state conditions, and the recommendations of federal and state agencies will be implemented.

3) Decisions concerning the feasibility of undertaking containment and cleanup efforts in areas less vulnerable to spilled oil will be made on a case-by-case basis by Exxon, Clean Seas, and the appropriate federal and state regulatory agencies.

Channel Island Response

All four of the Channel are considered biologically sensitive, as are the waters surrounding them. The waters out to six miles from the islands have been designated as a marine sanctuary. Each island is inhabited by many varieties of marine mammals and birds, including several endangered species.

In the event a large oil spill threatening to impact any one of the islands, every available means at the disposal of the oil industry, spill cooperatives and USCG Regional Strike Team should be made available to contain the slick before it enters the tidal zone of the islands. Should the weather and sea state be such that mechanical means were not effective in controlling the slick at sea, Exxon would recommend that approval for and use of dispersants be done as quickly as possible.

Most of the shorelines of the islands are high energy self-cleaning rocky shorelines, therefore, any oil impacting the islands would not accumulate or persist on the land mass very long. Every attempt to keep wildlife away from the slick should be made.

3. RESPONSE

OFFSHORE SPILL RESPONSE ORGANIZATIONS

In the event of an offshore oil spill, any or all of several response organizations may be activated. As shown by Figure 400-1, these organizations are:

Onsite Response Team (Exxon/contractor personnel)

Onsite Support Group (Exxon/contractor personnel)

Oil Spill cooperative (sponsored by member companies)

Emergency Response Team (Exxon)

Exxon Interfunctional Response Team

Regional or National Response Teams (federal government)

State Operating Team (California)

Generally speaking, the initial response to an oil spill will be provided by the Onsite Response Team (ORT) and Onsite Support Group (OSG). Should additional support be required, one of the oil spill cooperatives, Clean Seas or CCW will be activated, and contractors if they are required. For major spills, the Emergency Response Team (ERT) will also be called upon to coordinate and control the spill response efforts. In such an event, the federal and state governments will provide advice and standby assistance through their Regional (or National) Response and State Operating Teams, respectively.

The functions and responsibilities of each oil spill response organization are outlined in this chapter.

OIL SPILL RESPONSE

INITIAL RESPONSE

- ONSITE RESPONSE TEAM
  - ONSITE SUPPORT GROUP

BACKUP SUPPORT

EMERGENCY RESPONSE TEAM (DIV. & DIST. PERSON.)

COORDINATOR
- DIV. OPR. MGR.

FIELD OPERATIONS
- DRILLING
- CLEANUP MGR.
- ONSHORE OPR.
- MARINE OPR.
- ASSESSMENT SUPV.
- WASTE DISPOSAL

ADMINISTRATIVE
- LOGISTICS
- COMMUNICATIONS
- ACCOUNTING/CLAIMS

FUNCTIONAL STAFF
- P.R., LAW, SECURITY
- S[illegible]ETY, TRAINING

OIL SPILL COOPERATIVES

- CLEAN SEAS
- CCW
- (LARGE STATE OF THE ART EQUIPMENT)

CONTRACTORS

- TUG BOATS
- BARGES
- HEAVY EQUIP.
- TRUCKS
- MAN POWER

EXXON INTERFUNCTIONAL RESPONSE TEAM

ADVISORY/SPECIAL
- CLEANUP
- DISPOSAL
- CHEMICALS
- ECOLOGICAL
- RELIEF PERSONNEL

GOVERNMENT AGENCIES

- COAST GUARD
- STRIKE TEAM
- STATE OPR. TEAM
- FISH & GAME
- U.S. FISH & WILDLIFE
- NATL. MARINE FISHERIES SER.
- POLICE
- FIRE

Figure 400-1
Oil Spill Response Organization

401 ONSITE RESPONSE TEAM AND SUPPORT GROUP

Initial, on-scene response to oil spills will be provided by two groups, the Onsite Response Team (ORT) and the Onsite Support Group (OSG). Each of these teams is composed of Exxon or contractor personnel who are regularly assigned to the production or drilling facility. During spills, these groups shall answer to the Site Superintendent, and it shall be his responsibility to assign and train the members of the ORT and OSG.

The Onsite Response Team will consist of at least four members of the production facility, drilling vessel, or supply boat. During fuel or crude oil transfers, the ORT will be assigned to the topside transfer manifolds. Its function is to stop, contain, and clean up any spill that occurs during the transfer operations. For times other than during fuel transfers, the Site Superintendent shall designate a standing crew of four or more men to respond in the event of a spill. The ORT responsibilities are listed on page 400-17.

The ORT and OSG positions are shown in Figure 401-1. The Onsite Support Group will be comprised of four or more men and will be used only if the ORT requires assistance or relief. Each of the group's members should be familiar with the oil spill equipment and techniques for containing and recovering oil.

ONSITE RESPONSE ORGANIZATION

SITE SUPERINTENDENT

ONSITE RESPONSE TEAM
FOUR PEOPLE DESIGNATED FOR EACH HITCH

ASSIGNED TO DEPLOYMENT BOAT

One-Boat Captain/Supervisor
Two-Spill Boom/Equipment Handlers

ASSIGNED ONBOARD FACILITY

One-Boat/Equipment Deployment Handler

ONSITE SUPPORT GROUP
ASSIGNED AS REQUIRED

Supervisor(s)
Equipment Handlers

Figure 401-1
Revised Jan. 1984

402 OIL SPILL COOPERATIVES

Each of the spill cooperatives, Clean Seas (CS), and Clean Coastal Waters (CCW) is capable of responding to most spills without augmentation by Exxon personnel. However, in the event that any of the cooperatives must respond to a major spill, Exxon personnel will be used to provide supplementary staffing. As stated in the Offshore Spill Response Section, if an individual is assigned to both a spill cooperative's staff and the Emergency Response Team, that individual should perform both roles until a relief is designated by the Operations Manager.

83/16

SOUTHERN CALIFORNIA OIL SPILL COOPERATIVES
CLEAN SEAS & CLEAN COASTAL WATERS

OPERATING CONCEPT:

- PROVIDE SPILL EQUIPMENT, MANPOWER & TRAINING FOR PARTICIPANT COMPANIES
- PROVIDE REQUIRED STATE-OF-THE-ART OIL SPILL EQUIPMENT & OPERATING TECHNIQUES
- RESPOND TO OIL SPILLS IN THEIRAREA OF INTEREST AT THE REQUEST OF PARTICIPANT COMPANIES, GOVERNMENT AGENCIES OR NON-MEMBER COMPANIES
- RESPONSE TO REQUEST FROM PARTICIPANT COMPANY
  - PARTICIPANT COMPANY PROVIDES KEY STAFF POSITIONS WITH THEIR PERSONNEL
  - PARTICIPANT STAFFING ASSURES CONTROL OVER POTENTIAL LEGAL ACTION,CLAIMS, PUBLIC RELATIONS,GOVERNMENT LIAISON & EXPENDITURES
  - PARTICIPANT COMPANY IS RESPONSIBLE FOR ALL COSTS INCURRED FROM SPILL

Figure 402-1. OPERATING CONCEPT OF OIL SPILL COOPERATIVES

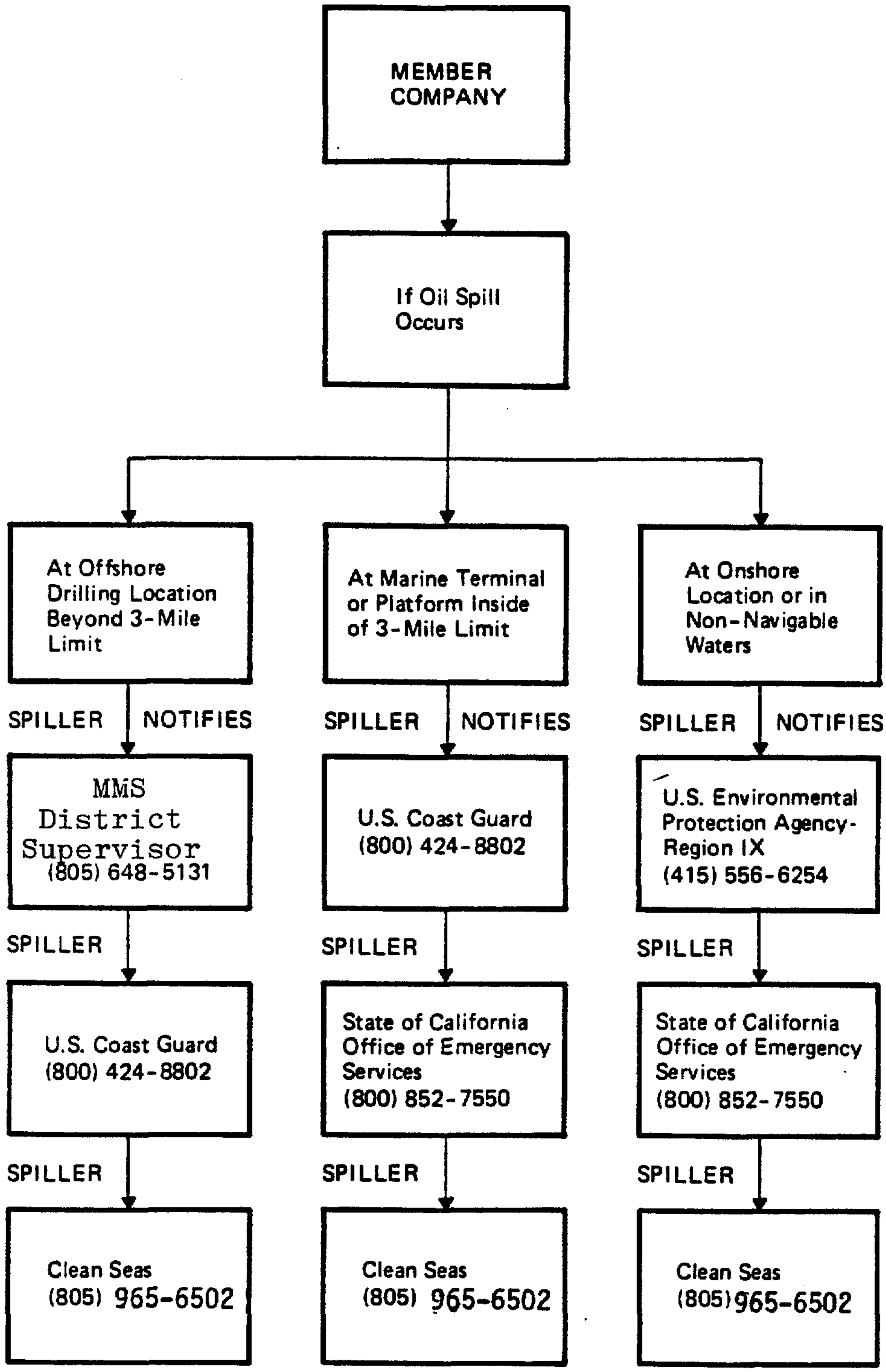


Figure 200-1. NOTIFICATION PROCEDURE

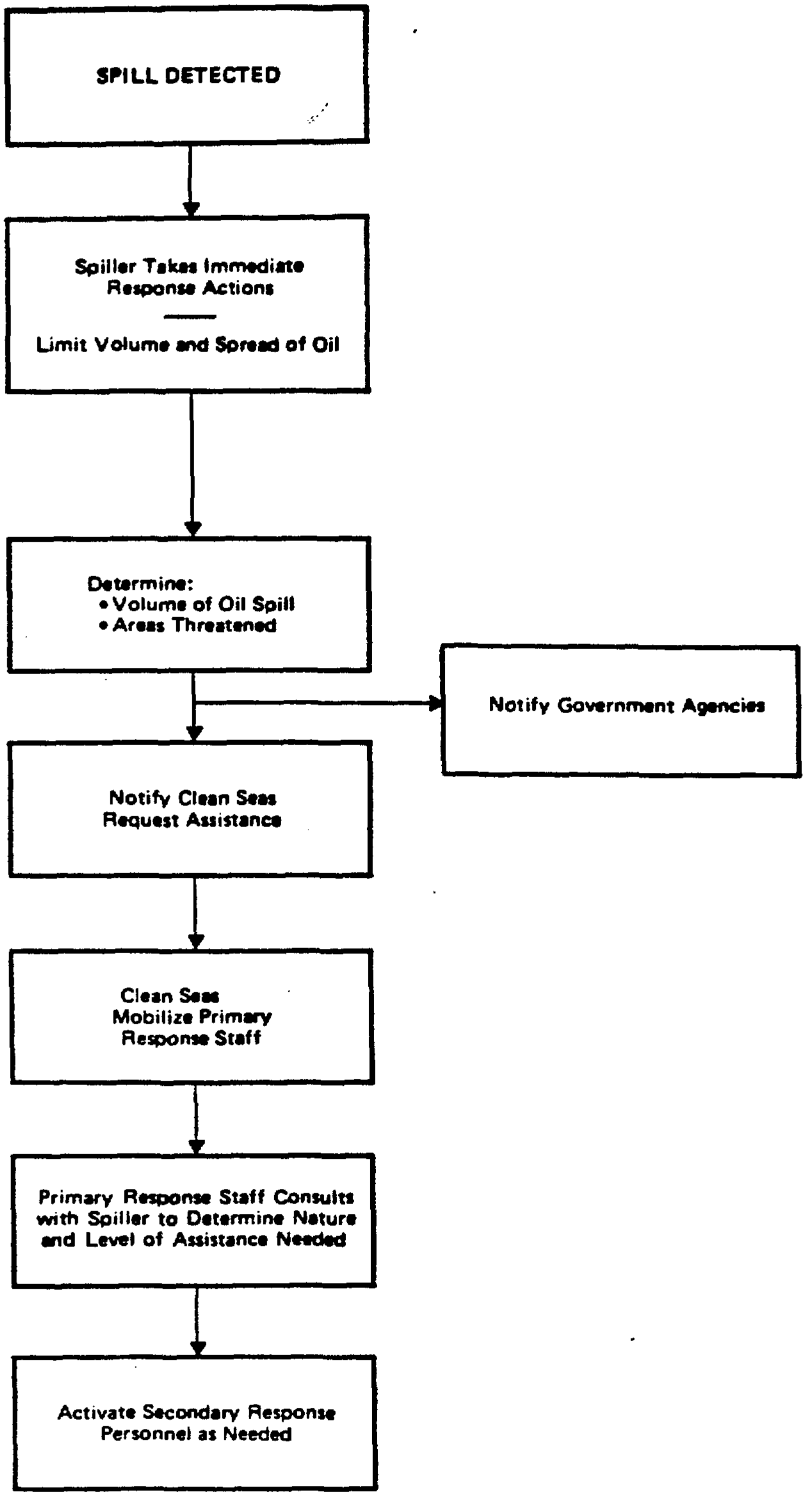


Figure 400-1. CS ORGANIZATION RESPONSE DIAGRAM

403 EMERGENCY RESPONSE TEAM

The Emergency Response Team is a standing organization of Exxon employees whose purpose is to provide operational, administrative, and functional support in the event an oil spill requires these services. For the most part, the ERT will be activated only for spills of major proportions, but it may also be used for spills of lesser magnitudes at the discretion of the California Operations Manager.

During a spill, the ERT will perform many functions. Figure 403-1 categorizes these functions according to the teams' major purposes. These functions are assigned to the individuals who fill the ERT positions as shown on the chart.

Emergency Response Team members will be notified as needed by the California Operations Manager or Environmental Manager who assumes control of all oil spill response operations as the Oil Spill Cleanup Coordinator.

Once the plan is activated, operations will generally be conducted on a 24-hour a day basis until the spill cleanup operations are complete. The job descriptions and responsibilities of various team members are given in the following subsections. ERT job titles, names and telephone numbers for each member/alternate are listed on pages 400-10 a&b. In the event of an oil spill, the listed ERT duties will supersede their normal responsibilities.

OIL SPILL CLEANUP COORDINATOR

FIELD OPERATIONS

- Cleanup & Restoration Manager
- Onshore Supervisor
- Marine Supervisor
- Assessment Supervisor
- Waste Disposal Supervisor
- Onsite Response Team

ADMINISTRATIVE SUPPORT

- Support Manager
- Logistics Supervisor
- Communications Supervisor
- Accounting Supervisor
- Claims Supervisor

FUNCTIONAL STAFF

- Legal Advisor
- Government Liaison Coordinator
- Environmental Coordinator
- Public Relations Coordinator
- Security Coordinator
- Documentation Supervisor
- Personnel Safety & Medical Service
- Training Coordinator

Figure 403-1. FUNCTIONS OF THE EMERGENCY RESPONSE TEAM

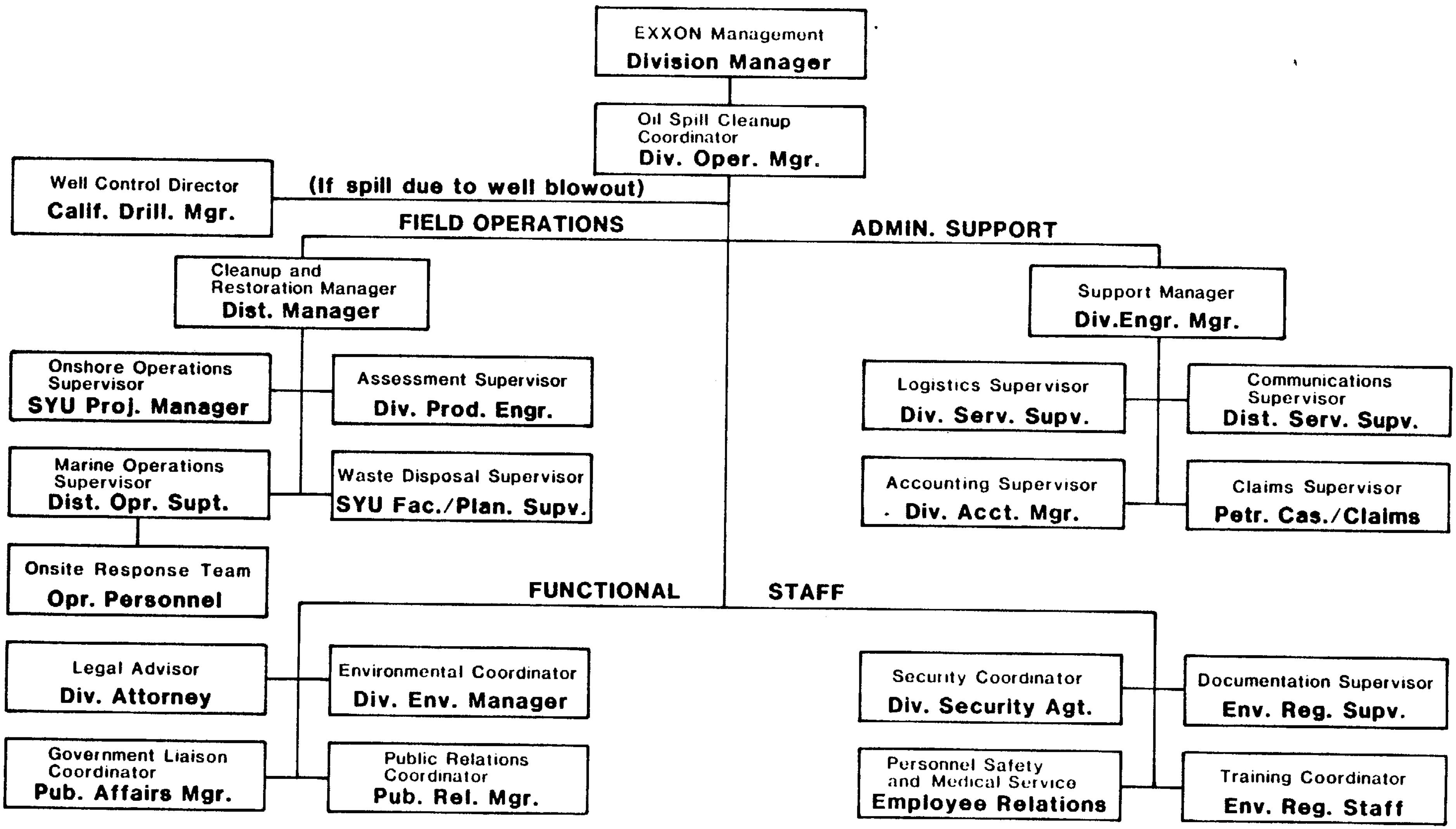


Figure 403-2

EMERGENCY RESPONSE TEAM

400-9

Revised June 1982

(ERT) EMERGENCY RESPONSE TEAM (APRIL, 1984)

Position	Member/ Alternate	Office	Home
Western Div. Mgr.	D.G. Warner	(805) 494-2350	(805)
Operations Mgr.	B.L. Boyd	(805) 494-2352	(805) 497-7146
EMERGENCY RESPONSE TEAM			
Oil Spill Cleanup Coord.	B.L. Boyd	(805) 494-2352	(805) 497-7146
	D.E. Cornett	(805) 494-2355	(805) 497-4427
Well Control Director			
OCS Offshore	*M.F. Rogers	(805) 654-6832	(805) 967-6504
Onshore	*J.E. Garrison	(805) 654-6834	(805) 659-1650
Cleanup & Restoration Mgr.	*L.M. Smedley	(805) 654-6833	(805) 493-1173
Support Mgr.	C.G. Lyons	(805) 494-2556	(805) 496-6142
	E.F. Sabatka	(805) 494-2219	(805) 497-3251
Marine Operations			
Supervisor-Onshore Oper.	*J.E. Garrison	(805) 654-6834	(805) 659-1650
Long Beach & L.A. Harbor Area	J. B. Odom	(805) 830-3240	
Supervisor-Santa Barbara Channel	*M.F. Rogers	(805) 654-6832	(805) 967-6504
Onshore Operations Supv.	T.H. Meadows,Jr.	(805) 494-2609	(805) 496-0383
	B.G. Altman	(805) 494-2614	(805) 495-6854
Assessment Supervisor	J.D. Rullman	(805) 494-2557	(805)
Documentation Supervisor	D.R. Olsen	(805) 494-2605	(805) 492-9534
	J.M. Schweizer	(805) 494-2357	(213) 991-1494
Waste Disposal Supervisor	B.G. Altman	(805) 494-2614	(805) 495-6854
	M.E. Fedak	(805) 494-2612	(805) 492-8286
Accounting Supervisor	E.M. Causey	(805) 494-2020	(805) 496-1442

All personnel located in Division Office except those noted by *.
*Ventura District Office from outside Exxon (805) 654-6800

(ERT) EMERGENCY RESPONSE TEAM (APRIL, 1984)

Position	Member/ Alternate	Office	Home
EMERGENCY RESPONSE TEAM			
Logistics Supervisor	C.M. Cunningham	(805) 494-2001	(805) 482-4473
	C.A. Weber	(805) 494-2010	(213) 360-0683
Claims Supervisor (Risk Management, Houston)	D.D. Dow	Excom 680-5528	
Communications Supervisor	*J.L. Resh	(805) 654-6801	
Legal Advisor	S.H. Moore, Jr.	(805) 494-2391	
	R.A. Drum	(805) 494-2397	(805) 643-0201
Gov't Liaison Coordinator	C. Burks	(805) 494-2419	(805) 497-6753
	A.B. Greathouse	(805) 494-2418	(805) 526-8165
Public Relations Coord.	D I Bolding	(805) 494-2415	(213) 762-2811
	A.B. Greathouse	(805) 494-2418	(805) 526-8165
Security Coordinator	K.R. Gillespie	(805) 494-2115	(213) 889-3927
	J.L. Garcia	(213) 492-6200	(714) 636-3189
Personnel Safety & Medical Services Coordinator	M.J. Morris	(805) 494-2265	(213) 892-5527
	G.L. Palmer	(805) 494-2270	(213) 888-3867
Training Coordinator	D.R. Olsen	(805) 494-2605	(805) 492-9534
	H.E. Schlesinger	(805) 494-2363	(213) 889-4794

Oil Spill Cleanup Coordinator (Div. Opr. Mgr.)

The Oil Spill Cleanup Coordinator will be Exxon's on-scene management representative during oil spill response activities. He will direct and control the Emergency Response Team and oil spill response actions and will assess the magnitude of the oil spill. He will determine and authorize the personnel to be mobilized; act as official spokesman to the news media; ensure that Contingency Plan is kept current; ensure training is implemented.

Responsibilities.

- Assess potential movement, magnitude, and hazard of the spill.
- If the spill is assessed as hazardous by onsite superintendent, ensure the removal of all personnel from the facility who are not essential for spill containment operations.
- Activate the Contingency Plan; implement protective measures and containment procedures; provide for oil cleanup.
- Activate Emergency Response Team Members as necessary.
- Establish Emergency Response Team headquarters. (Clean Seas, Ventura District Office, or private offices)
- Coordinate company activities with Oil Spill Cleanup Cooperatives.
- Inform Exxon Management of size of spill and of actions taken. (Production and/or Exploration Managers as appropriate)
- Ensure that appropriate government agencies are notified; provide necessary reports to government agencies.
- Act as official Western Division spokesman to the news media.
- Document all actions.
- Schedule training programs on a regular basis so that all Emergency Response Team personnel are thoroughly familiar with their assigned duties and operation of equipment.
- Ensure that the Contingency Plan is kept current and that revisions are made as necessary.

Well Control Director (Drlg. Mgr.)

The Well Control Director will be responsible for abating the oil spill at its source in case of a well related spill.

Responsibilities.

- Examine the source of the spill using engineering, consulting services, or salvage organizations as required.
- Develop the most effective means to abate the spill at its source considering, in order: personnel safety, environmental impact, cost, and time.
- Direct repair or salvage operations until the spill is completely abated.
- Direct necessary removal and proper disposal of related damaged equipment.

Cleanup and Restoration Manager (Dist. Mgr.)

The Cleanup and Restoration Manager will supervise the overall field containment and cleanup operations, both on water and on shore, as directed by the Oil Spill Cleanup Coordinator. He will develop and conduct cleanup plans and procedures and will establish the sequence of cleanup operations.

Responsibilities.

- Supervise containment and cleanup actions after joining the Onsite Response Team in the field.
- Ensure that equipment assigned to the Onsite Response Team is maintained, is operational, and is readily deployable.
- Make an on-scene spill assessment and personnel and equipment recommendations to the Oil Spill Cleanup Coordinator for subsequent cleanup operations.
- Maintain communication with the Oil Spill Cleanup Coordinator throughout immediate response operations.
- Establish cleanup headquarters and provide staff as necessary for:
  - marine containment and cleanup operations
  - onshore containment and cleanup operations
  - sensitive-area protection
- Assist the Oil Spill Cleanup Coordinator in determining the magnitude and movement of the spill and make recommendations for actions to be taken.
- Inform Support Manager of manpower, equipment, and supplies needed to carry out cleanup operations.
- Dispatch and supervise Emergency Response Team personnel and other manpower and equipment as necessary to take effective emergency action for containment, exclusion, and cleanup.
- Determine which areas require maximum containment and cleanup efforts and assign personnel as necessary.

- Report progress of containment and cleanup activities to Oil Spill Cleanup Coordinator.

- Maintain communications with Marine Operations and Assessment Supervisors about oil slick movement. Dispatch teams as directed by the Oil Spill Cleanup Coordinator to protect sensitive areas that may be affected.

- Document all actions.

Support Manager (Div. Eng. Mgr.)

The Support Manager will supervise and coordinate all actions of the Emergency Response Team headquarters staff; furnish supplies, equipment, and manpower as required by the Team; keep records of actions for future reports; and pay contractors hired to assist during the spill.

Responsibilities.

- Establish report headquarters and provide staff as necessary for:

  - logistics
  - documentation
  - accounting
  - communications
  - claims

- Maintain contact with Oil Spill Cleanup Coordinator and Cleanup and Restoration Manager so that their needs (present and anticipated) can be met.

- Ensure that adequate manpower is available and that proper equipment and supplies are stockpiled and ready for distribution.

- Ensure that the required communications equipment is mobilized and placed in service and that steps are taken for proper maintenance.

- Provide twenty-four hour manning of headquarters radio and communications during oil spill cleanup.

- Document all actions.

Marine Operations Supervisor (Dist. Opr. Supt.)

The Marine Operations Supervisor will direct and coordinate all marine containment, protection, and cleanup activities on southern California offshore waters as directed by the Cleanup and Restoration Manager.

There are two marine operations supervisors designated to cover Exxon's California operations. One will supervise marine operations for the Santa Barbara Channel area and one for all other areas.

Responsibilities.

- Obtain radios and establish firm schedule of communication with Cleanup and Restoration Manager.
- Assign personnel and equipment to specific marine containment, protection, and cleanup activities.
- Ensure that equipment and supplies required for marine operations are maintained in operational condition.
- Ensure that appropriate personnel are trained to use the necessary equipment and supplies.
- Advise Cleanup and Restoration Manager of progress, all suggested changes in plans, and requests for equipment and personnel.
- Provide necessary support to Onshore Operations Supervisor.
- Coordinate with the Waste Disposal Supervisor the disposal of recovered oil and oil-contaminated materials in approved disposal sites.
- Document all actions.

Onsite Response Team

The Onsite Response Team is comprised of Exxon/Contractor onsite personnel. They are to be trained in all aspects of oil spill containment. They will be directed by the onsite superintendent as the first line containment and cleanup operations group.

Responsibilities.

- Acknowledge and shut down spill source as quickly as possible. If fuel oil loading spill, shut down transfer pump(s) and close valves.
- Notify site superintendent immediately; describe nature and extent of spill.
- On supervisor's instruction shut down all contributing source equipment such as pumps, compressors, vessels, wells, etc.
- Ensure spill source is isolated if not automated or should automated shutoffs fail. (upstream and downstream of leak)
- If offshore, at supervisor's command, deploy containment equipment-work boat, boom, skimmer, floating storage container and absorbent materials.
- All offshore personnel are to be thoroughly trained in the use of all pollution control equipment.
- All offshore personnel will perform practice drills with containment equipment at least once annually.

Onshore Operations Supervisor (SYU Proj. Mgr.)

The Onshore Operations Supervisor will supervise and coordinate all shoreline and terrestrial containment, protection, and cleanup operations as directed by the Cleanup and Restoration Manager.

Responsibilities.

- Assign personnel and equipment to specific shoreline and/or terrestrial containment, protection, and cleanup activities.
- Obtain radios and establish firm schedule of communication with Cleanup and Restoration Manager.
- Supervise shoreline and terrestrial operations, including outside contractors; modify manpower and equipment requirements as necessary to ensure efficient operations.
- Establish containment, protection, and cleanup areas along the Southern California coastline.
- Advise Cleanup and Restoration Manager of progress, suggested changes in plans, and requests for equipment and personnel.
- Provide support to Marine Operations Supervisor as requested.
- Coordinate with the Waste Disposal Supervisor the disposal of recovered oil and oil-contaminated materials in approved disposal sites.
- Document all actions.

Assessment Supervisor (Div. Prod. Eng.)

The Assessment Supervisor will implement surveillance of oil spill movement, provide information on movement and recommend response actions to the Cleanup and Restoration Manager.

Responsibilities.

- Establish radio communications schedule with the Cleanup and Restoration Manager.
- Conduct surveillance of oil spill and inform the Cleanup and Restoration Manager of its extent, its location, the direction of its movement, and the emergency actions required.
- Conduct aerial surveillance, if necessary, to assist in placing containment booms and skimmers.
- Notify Cleanup and Restoration Manager of affected or threatened shoreline and land areas.
- Recommend deployment of cleanup equipment to uncontained oil spills.
- Report the observed effectiveness of response actions and equipment to the Cleanup and Restoration Manager.
- Document all actions.

Waste Disposal Supervisor (SYU Fac./Plan. Supv.)

The Waste Disposal Supervisor will arrange for disposal of oil, oil/water mixture, and oil-contaminated debris at designated locations as directed by the Cleanup and Restoration Manager.

Responsibilities.

- In conjunction with the Government Liaison Coordinator, request the appropriate County Sanitary Districts and the Regional Water Quality Control Board to designate suitable disposal sites and to issue applicable permits.

- Ensure that designated disposal sites for oil, oil/water mixture, and oil-contaminated debris are prepared to accept waste materials.

- Coordinate transfer of waste materials to disposal sites with the Marine and Onshore Operations Supervisors.

- Supervise transfer of waste materials to disposal sites and advise the Cleanup and Restoration Manager of the volumes of oil, oil/water mixture, and oil-contaminated debris placed on disposal areas.

- Maintain a log of volume and description of all waste materials transferred to disposal areas.

- Document all actions.

Accounting Supervisor (Div. Acc't. Mgr.)

The Accounting Supervisor will institute controls to ensure that the costs of activities related to the oil spill are documented.

Responsibilities.

- Provide accounting functions, including necessary auditing; preparation of billings; payment of invoices; and documentation of labor, materials, and services used during spill, including:

  - labor expended with breakdown of hours and rates for:

    Emergency Response Team
    cleanup contractor and subcontractor personnel
    consultants

  - equipment rentals with breakdown of hours and rates for:

    heavy equipment
    aircraft
    boats
    transportation

  - materials and supplies purchased or rented, such as:

    sorbents
    tools
    booms
    food
    clothing

- Advise the Support Manager of monies expended and prepare cost forecasts of completing oil spill response operations.

- Perform other accounting functions as required.

Logistics Supervisor (Div. Serv. Supv.)

The Logistics Supervisor will provide the necessary manpower, equipment, and supplies to conduct containment, protection, cleanup, and restoration.

Responsibilities.

- Alert service contractors to the emergency and activate them as necessary at the request of the Support Manager.
- Obtain the manpower and equipment requested by the Support Manager in response to the needs of the Cleanup and Restoration Manager or the Oil Spill Cleanup Coordinator.
- Arrange for food and lodging as necessary for personnel activated for the oil spill.
- Purchase supplies and equipment required by the Emergency Response Team.
- Arrange for aircraft or vessels for reconnaissance of spill movements.
- Coordinate the dispatch and operations of aircrafts or vessels.
- Document all actions.

Claims Supervisor (Petr. Cas./Claims)

The Claims Supervisor will receive and process claims for damage attributable to the oil spill and to subsequent containment, cleanup, and restoration.

Responsibilities.

- Become thoroughly familiar with extent of the oil spill and possible areas of liability.
- Establish procedures for receiving, reviewing, and processing damage claims.
- Arrange for and supervise services of marine surveyors and adjustors.
- Establish contact with Legal Advisor for necessary guidelines.
- Document all actions.
- For OCS spills, maintain liaison with Coast Guard OCS Liability Fund Representative.

Documentation Supervisor (Div. Env. Reg. Supv.)

The Documentation Coordinator will document all aspects of the oil spill containment, cleanup, and restoration activities.

Responsibilities.

- Establish a system for keeping a complete chronological record of all activities related to the oil spill.
- Arrange for all important aspects of the oil spill to be documented as discussed in Section 702 (Documentation).
- Assist all Emergency Response Team Supervisors in keeping a chronological record of their activities and observations.
- Hire a press clipping service to collect all articles covering the oil spill.
- Prepare and submit to the Oil Spill Cleanup Coordinator, the Public Relations Coordinator, and the Government Liaison Coordinator data necessary for reports required by government agencies.
- Document all actions of Emergency Response Team.

Communications Supervisor (Dist. Serv. Supv.)

The Communications Supervisor will provide and maintain radio and telephone communication systems adequate to meet the needs of the contingency operations. All field supervisory personnel should have radio contact with the Emergency Response Team headquarters.

Responsibilities.

- Provide for a radio communication system among Emergency Response Team personnel including:
  - Oil Spill Cleanup Coordinator
  - Cleanup and Restoration Manager
  - Support Manager
  - Marine Operations Supervisor
  - Onshore Operations Supervisor
  - Assessment Supervisor
- Provide radio or telephone communication systems among all Team personnel.
- Ensure that replacement batteries and recharging equipment for radios are located at each main point of use.
- Arrange for additional radios and/or telephones as necessary in Emergency Response Team headquarters.
- Maintain a record of distribution of radios and prepare a list of distribution and call numbers for each Team member or group using radios.
- Provide routine maintenance and check of radio system in non-emergency periods.
- Document all actions.

Legal Advisor (Div. Attorney)

The Legal Advisor will advise the Oil Spill Cleanup Coordinator, the Public Relations Coordinator, and the Government Liaison Coordinator on all legal aspects of the oil spill.

Responsibilities.

- Become thoroughly familiar with all aspects of the oil spill from which legal actions could arise.
- Advise the Oil Spill Cleanup Coordinator and the Documentation Coordinator of the kinds of records and documentation that possible suit actions and settlements would require.
- Provide legal guidelines for press releases to the Public Relations Coordinator.
- Advise the Oil Spill Cleanup Coordinator and the Claims Supervisor of necessary claims and adjustment services.
- Inform appropriate personnel of records required for insurance and claims settlements.
- Provide guidelines for claims handling; coordinate efforts of the Claims Supervisor.
- Provide other legal assistance as requested by the Oil Spill Coordinator.
- Ensure that the contingency plan reflects changes in oil spill regulations promulgated by government agencies.
- Document all actions.

Government Liaison Coordinator (Pub. Affairs Mgr.)

The Government Liaison Coordinator provides liaison with government representatives and conveys information, requests, and directives to and from the Oil Spill Cleanup Coordinator.

Responsibilities.

- Ensure that all appropriate regulatory and government bodies have been advised of the spill (page 200-14 Government Agency Notification).

- Coordinate release of information to government representatives with the Oil Spill Cleanup Coordinator, the Legal Advisor, and the Public Relations Coordinator to ensure that such information is correct and consistent.

- Obtain approval, as directed by Oil Spill Cleanup Coordinator, from appropriate government agencies for specific operations that are subject to regulations, such as use of government-owned equipment, access to lands, use of chemical agents, and location and use of disposal sites.

- Establish and maintain liaison with representatives of regulatory and government bodies and convey information, requests, and directives to appropriate members of the Oil Spill Task Force.

- Set up observation tours of the cleanup and restoration operations for federal, state, and local representatives, provided such tours are cleared with the Oil Spill Cleanup Coordinator and do not interfere with oil spill response operations.

- Serve as an Emergency Response Team representative on any committee or group formed by government or cooperative to assist in the emergency operations.

- Prepare the necessary reports to government agencies.

- Perform other duties as directed by the Oil Spill Cleanup Coordinator.

- Document all actions.

Public Relations Coordinator (Public Rel. Mgr.)

The Public Relations Coordinator will advise and assist the Oil Spill Cleanup Coordinator in his contacts with the news media and will prepare press releases and other material for Exxon Management.

Responsibilities*

- Prepare press releases for the Oil Spill Cleanup Coordinator and Exxon Management. Press releases should include the following information as it becomes available:

  - description of spill and affected areas
  - description of cleanup and restoration measures undertaken and planned
  - details of special efforts taken to protect sensitive areas

- Provide answers to press queries relating to cleanup and restoration operations.

- Consult with the Oil Spill Cleanup Coordinator and the Legal Advisor regarding content of releases.

- Maintain a close working relationship with all news media, government agencies, conservation groups, and civic and public organizations. Make arrangements for onsite inspection by reporters and others, as necessary.

- Prepare "fact sheets" on information relating to the oil spill for distribution to the Emergency Response Team.

- Document all actions.

*Guidelines for public relations are contained in Appendix E.

Environmental Coordinator (Div. Env. Mgr.)

The Environmental Coordinator will advise the Oil Spill Cleanup Coordinator, and the Cleanup and Restoration Manager, on environmental aspects related to the impact of the spill on proper cleanup and restoration procedures for affected areas and on subsequent response actions. He will recommend methods of restoring areas to their pre-spill condition and to assist in the care of wildlife.

Responsibilities.

- Become thoroughly familiar with the environmental characteristics of the southern California coast, particularly with ecologically sensitive areas.
- Help to conduct onsite surveys to determine extent of oil contamination and advise the Oil Spill Cleanup Coordinator, and the Cleanup and Restoration Manager, on cleanup and restoration procedures.
- Assist in establishing an environmental monitoring program during spill, post-spill, and restored conditions.
- In conjunction with the Government Liaison Coordinator and the Public Relations Coordinator, provide liaison as requested by the Oil Spill Cleanup Coordinator between the Emergency Response Team and various government and public environmental groups.
- Recommend environment specialists who can conduct a physical and biological environmental monitoring program to assess the impact of the oil spill.
- Provide environmental statements for press releases as requested by the Public Relations Coordinator and the Oil Spill Cleanup Coordinator.
- Assess existing and anticipated damage to birds and other wildlife.

- In cooperation with the State of California Department of Fish and Game, ensure that every reasonable effort is made to recover, clean, and rehabilitate affected wildlife.
- Coordinate efforts of volunteer individuals and organizations to clean and rehabilitate birds and other wildlife.
- Conduct training programs with key personnel, under the supervision of qualified consultants or contractors, so that they can learn acceptable wildlife care techniques.
- Keep up to date on new developments in bird and wildlife cleaning and rehabilitation techniques and advances in overall oil spill restoration.
- Document all actions.

Security Coordinator (Div. Security Agent)

The Security Coordinator will direct and coordinate all security arrangements for manpower and equipment at onshore staging areas and at Emergency Response Team headquarters.

Responsibilities.

- Establish security arrangements for stockpiled oil spill equipment and supplies.
- Assign security personnel as needed to equipment staging areas and Emergency Response Team headquarters.
- Coordinate security arrangements with local law enforcement agencies.
- Provide for crowd or spectator control as requested by Oil Spill Cleanup Coordinator.
- Provide access control to staging areas and Emergency Response Team headquarters as requested by Oil Spill Cleanup Coordinator.
- Document all actions.

Personnel Safety and Medical Services Coordinator (Div. Empl. Rela.)

The Personnel Safety and Medical Services Coordinator will provide liaison with local medical personnel and facilities and will coordinate safety requirements with the U.S. Coast Guard.

Responsibilities.

- Arrange for ambulance, hospital, and medical services as needed.
- Coordinate safety and medical efforts with U.S. Coast Guard and with oil spill cooperatives.
- Prepare any safety-related reports as requested by the Oil Spill Cleanup Coordinator.
- Document all actions.

Training Coordinator (Env. Reg. Staff)

The Training Coordinator will ensure that the Response Teams are properly trained to implement the Contingency Plan and that all members are thoroughly familiar with their responsibilities and with the equipment, supplies, and materials required to carry them out.

Responsibilities*

- Ensure that Response Team members have received necessary training and instructions to allow them to effectively carry out their responsibilities. If Team members are changed, the replacement personnel are to be trained to ensure complete familiarity with their tasks.

- Based on the contents of this Contingency Plan, prepare and conduct training exercises ("spill drills") to allow Team members to become familiar with cleanup equipment, supplies, and materials and with their responsibilities for oil spill containment and protection.

- Ensure that this Oil Spill Contingency Plan is kept up to date with current listings of assigned personnel.

- Update this Oil Spill Contingency Plan throughout the year to reflect the latest state of the art in oil spill technology as instructed by the Oil Spill Cleanup Coordinator.

- Update or modify this Oil Spill Contingency Plan if weaknesses are noticed during spill operations or training exercises.

- Perform other duties as directed by the Oil Spill Cleanup Coordinator.

- Document all actions and forward to the Oil Spill Cleanup Coordinator.

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*Details on training requirements are discussed in Appendix C.

404 FEDERAL AND STATE OIL SPILL RESPONSE TEAMS

Both the federal and California governments maintain oil spill response teams. Although there are several levels of response on the federal level, the federal Regional Response Team (RRT) is the team which will become immediately involved in the event of a major discharge; in such event, the RRT is activitated automatically.

The state team, on the other hand, is activated at the discretion of the State Operating Authority (SOA) who represents the state on the RRT. The relationships among the various response teams are shown in Figure 404-1.

As has been stated, federal response is comprised of several different levels of response. These are: at the national level, the National Response Team; at the regional level, the Regional Response Teams; at the local level, designated On-Scene Coordinators (OSC).

Regional Response Team

The Regional Response Team (RRT) is composed of the Commander of the Eleventh U.S. Coast Guard District; the Director of Surveillance and Analysis Division of the Regional Environmental Protection Agency; Commander of the U.S. Western Air Force Reserve Region; Director of the California Office of Emergency Services; and representatives from the U.S. Corps of Engineers (Los Angeles District), the Eleventh Naval District, Headquarters Sixth U.S. Army, U.S. Fish and Wildlife Service, and Regional Oil and Gas Division of the U.S. Geological Survey. Headquarters for the Regional

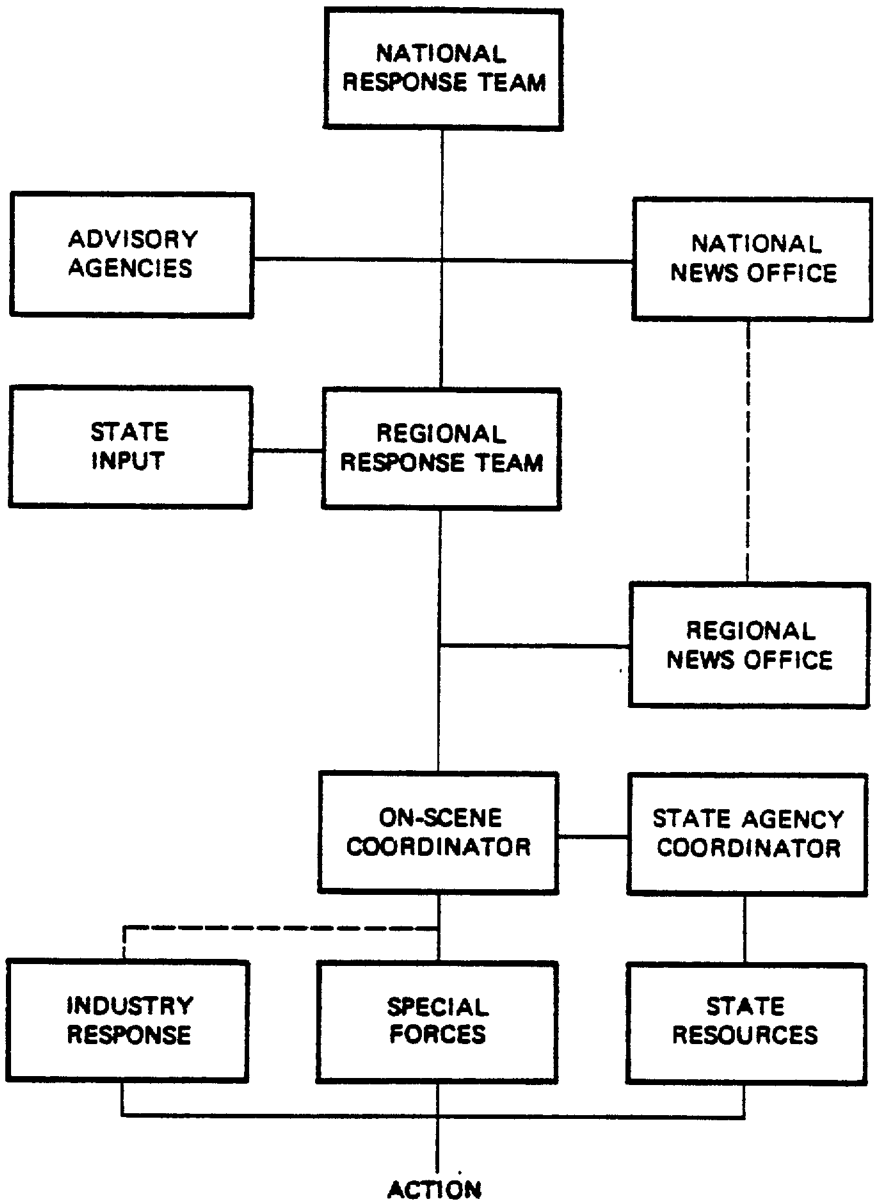


Figure 404-1. FEDERAL OIL SPILL RESPONSE

Response Team is the Eleventh Coast Guard District office in Long Beach. Each federal Regional Response Team (RRT) acts within its region as an emergency response team under direction of the On-Scene Coordinator (OSC). It is the responsibility of the OSC to gather pertinent facts about: the spill's impact upon human health; the nature, amount, and location of material spilled; the resources that will be affected, and the priorities for protecting those resources. The OSC will encourage the responsible or involved parties to take the initiative in correcting the problem if they are able; <u>if they are not, the OSC will call for and direct the deployment of available resources to initiate containment, cleanup, restoration, and disposal</u>. The OSC will document and record all activities during cleanup operations. The documentation of actions, equipment, techniques, and progress provide protection for the federal agencies involved. Regardless of who is in control of cleanup, the OSC is responsible for the adequacy of the spill response operation, which means that he must maintain surveillance over the operations and evaluate both the short-term and long-term effects of the spill.

The federal regional plan for California's navigable waters adjoining shorelines, for coastal territorial waters, and for the contiguous zone and high seas beyond this zone where there exists a threat to U.S. waters, calls for a single predesignated executive to coordinate and direct federal pollution control efforts at the scene of a spill. The U.S. Coast Guard provides the On-Scene Coordinator to direct cleanup operations in coastal waters, ports and harbors.

The federal regional plan for California's inland navigable waters also establishes a single predesignated executive to coordinate and direct federal pollution control efforts at the scene of a spill. The Environmental Protection Agency provides the On-Scene Coordinator to direct cleanup operations in inland waters.

The following federal agencies have responsibilities, established by statute, which may bear on the response to a pollution spill:

- Department of Commerce is responsible for providing the response teams with information regarding marine environment; living marine resources; and current and predicted meteorological, hydrological, and oceanographic conditions through the National Oceanic and Atmospheric Administration (NOAA).

- Department of Health and Human Services is responsible for providing assistance in spills that present a possible threat to public health and safety.

- Department of Defense may help to maintain navigation channels, and may assist with salvage and the removal of obstructions.

- Department of Interior provides information and expertise in oil production and pipeline transportation and also provides technical information to the OSC and RRT regarding land, fish and wildlife, and other resources for which it is responsible.

- Department of Transportation is expert in all modes of transportation and movement of oil and hazardous substances. The U.S. Coast Guard supplies support in the fields of port safety and security, marine law enforcement, and operation and safety of vessels and marine facilities.

- Environmental Protection Agency will provide technical expertise to RRT in environmental pollution control techniques, including assessment of damages and environmental restoration.

Special Forces

The National Strike Force consists of trained personnel who are prepared and available to provide technical expertise, supervisory assistance, and aid in the deployment of special equipment. The National Strike Force consists of U.S. Coast Guard Strike Teams on the Pacific, Atlantic, and Gulf coasts. Any combination of teams may be activated.

Within two hours of notification, the Pacific Strike Team can provide at least four men who can be activated by the On-Scene Coordinator, by the Coast Guard, or by a direct request to the commanding officer of the Strike Team.

State Response Organization

The Oil Spill Contingency Plan adopted by the State of California provides for a coordinated response of state agencies to an oil spill. The plan sets up a State Operating Authority (SOA) who will represent the state on the Regional Response Team and who will have the authority to declare an oil spill a pollution incident and to activate the State Contingency Plan.

When the SOA declares a pollution incident, he will then appoint a State Agency Coordinator (SAC) who will be in charge of on-scene operations for all state agencies engaged in combating a pollution incident. These agencies will comprise the State Operating Team (SOT). The SOA will also act in a capacity similar to that of the federal On-Scene Coordinator, with whom he will work closely. Figure 404-2 details the State of California's organizational response to a major oil spill. A State Support Team (SST) consisting of various state department executives will authorize the SOA and will monitor and evaluate his reports. The SST will also administer a standing State Interagency Oil Spill Committee (SIOSC) which will establish liaison with public and private oil pollution control organizations, review the state contingency plan, and recommend research and development. The SIOSC has no direct-line authority during an oil spill.

The state oil contingency plan also requires that a delegate from the representative industry be appointed to the SOT. The Exxon Government Liaison Coordinator will normally assume this position as described in Section 403.

Federal and State Contingency Plans

Existing contingency plans prepared by other agencies for the state of California are listed below. Copies of these contingency plans will be maintained by the Documentation Engineer.

- National Oil and Hazardous Substances Pollution Contingency Plan.

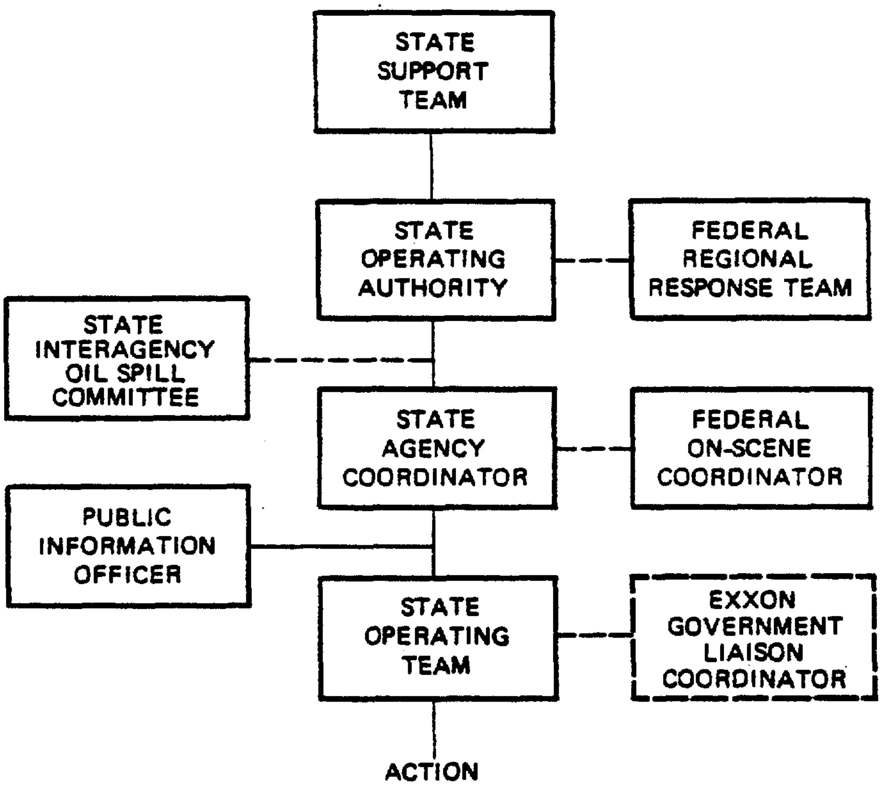


Figure 404-2. CALIFORNIA OIL SPILL RESPONSE

- Region IX Oil and Hazardous Materials Pollution Contingency Plan for Inland Waters issued by the Environmental Protection Agency.

- Region IX Pollution Contingency Plan as revised December 1971, issued by the Commander, Twelfth Coast Guard District.

- State of California Oil Spill Contingency Plan, revised May 1983.

TRAINING AND DRILLS

Onsite Responses Team (ORT) and Support Group

All personnel assigned to the ORT shall be trained in the use of all pollution control equipment. Training will consist of classroom instruction and actual equipment deployment and operation from the platform. hands-on equipment deployment will be conducted under realistic environmental conditions in which the equipment can safely be deployed without endangering the lives of the personnel. Personnel shall also participate in training exercise conducted by the oil spill cooperatives as time allows from their regular duties. Records shall be maintained on board the platform for MMS inspection of all personnel participating in pollution control training.

Supervisors

The supervisory personnel responsible for directing oil spill control shall receive instruction suitable for all seasons. These persons shall also have a working knowledge of all oil spill control equipment associated with the offshore facilities.

Drills

The personnel making up the ORT shall participate in an annual preplanned drill to be witnessed by MMS Districts personnel. Sufficient advanced notice shall be given to the MMS to allow MMS personnel to witness the drill. Exxon personnel shall also be trained and available to conduct a surprise drill at the request of MMS so long as it does not interfere with critical operations. All drills will be documents and the records maintained on the platform.

Emergency Response Team (ERT)

Periodic training instruction shall be conducted to familiarize the ERT members with their assigned duties.

5. IDENTIFICATION OF COASTAL AREAS

IDENTIFICATION OF COASTAL AREAS

The coastline areas that may be impacted by an oil spill from the Point Pedernales field operations are identified in this section. These coastal areas have been selected on the basis of the spill trajectory analyses prepared for this project. The segment maps depicting the shoreline characteristics and other pertinent information are taken from Clean Seas Oil Spill Cleanup Manual. Although the probability of a spill from the Point Pedernales facilities impacting the shoreline is extremely low, these plats will provide needed information to persons responsible for containment and cleanup in the event the shoreline is threatened.

SUMMARY OF SHORELINE CLEANUP TECHNIQUES

Shoreline Type	Considerations Concerning Cleanup Activities
Exposed Rocky Headlands	. On very steep shores, no cleanup would be necessary . On less steep shores, high-pressure spraying would be effective only while oil remains liquid
Wave-Cut Platforms	. High-pressure spraying of rocks may be effective . Manual/mechanical cleanup of thick oil accumulations is recommended with caution
Fine/Medium-Grained Sand Beaches	. Cleanup should begin only after majority of oil is deposited onshore . Cleanup should concentrate on removal of oil from upper swash zone . Mechanical methods should be used cautiously but, generally, fine grained sand beaches are among the easiest to clean mechanically because of their hard, compact substrate . Removal of sand should be minimized
Coarse-Grained Sand Beaches	. Cleanup should commence only after majority of oil is deposited onshore . Cleanup should concentrate on removal of oil from upper swash zones . Mechanical methods should be used cautiously . Sediment removal should be minimized
Mixed Sand and Gravel Beaches	. Oil should be removed primarily from upper swashlines . High pressure spraying may be necessary . Mechanical reworking of sediment into the surf zone effective if oil accumulation is heavy . Removal of sediment should be restricted

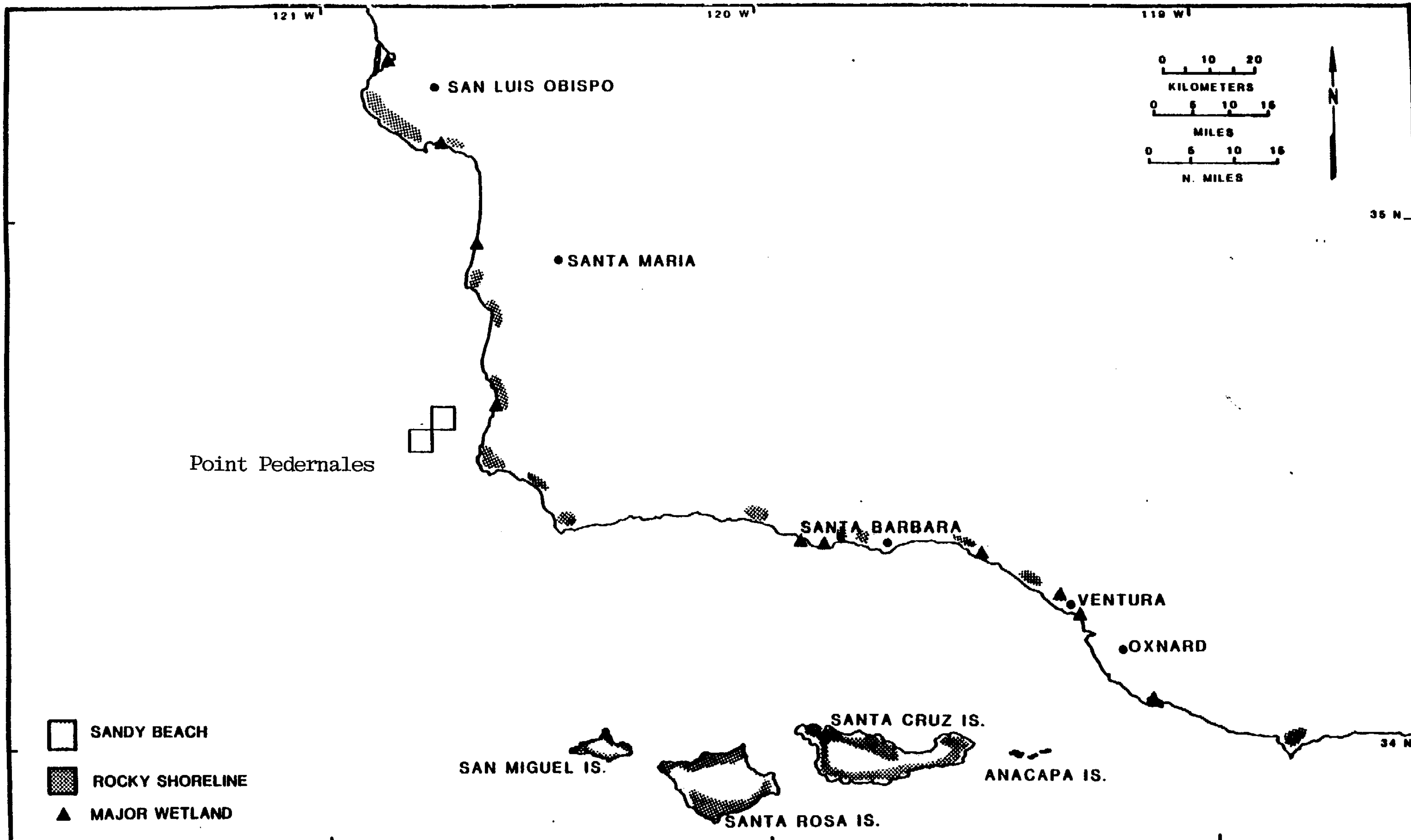


FIGURE II-3 SHORELINE TYPES : SANTA MARIA BASIN AND SANTA BARBARA CHANNEL OCS AREAS

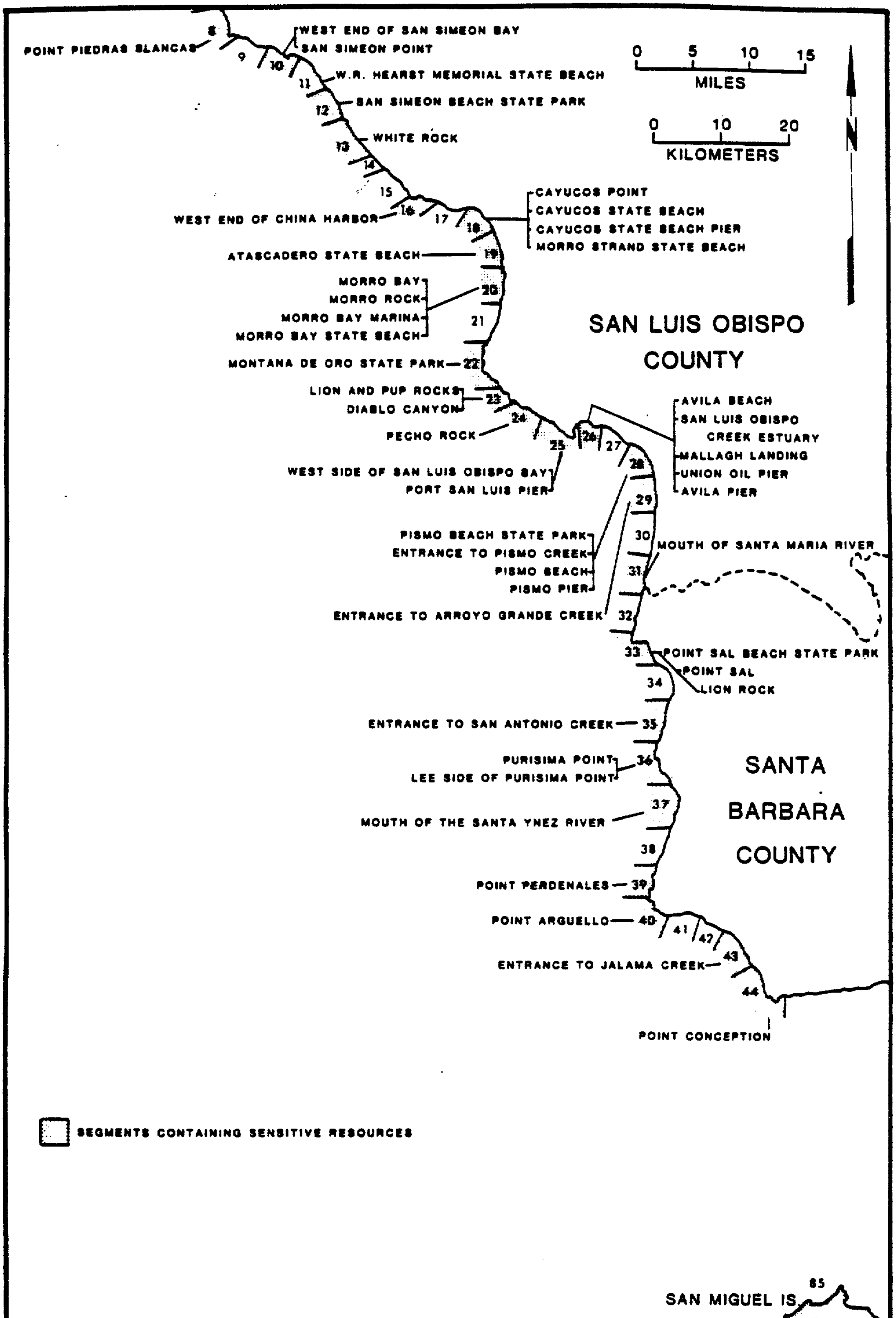


FIGURE II-1 SENSITIVE AREAS WITHIN CLEAN SEAS SEGMENTS BORDERING THE SANTA MARIA BASIN OFFSHORE

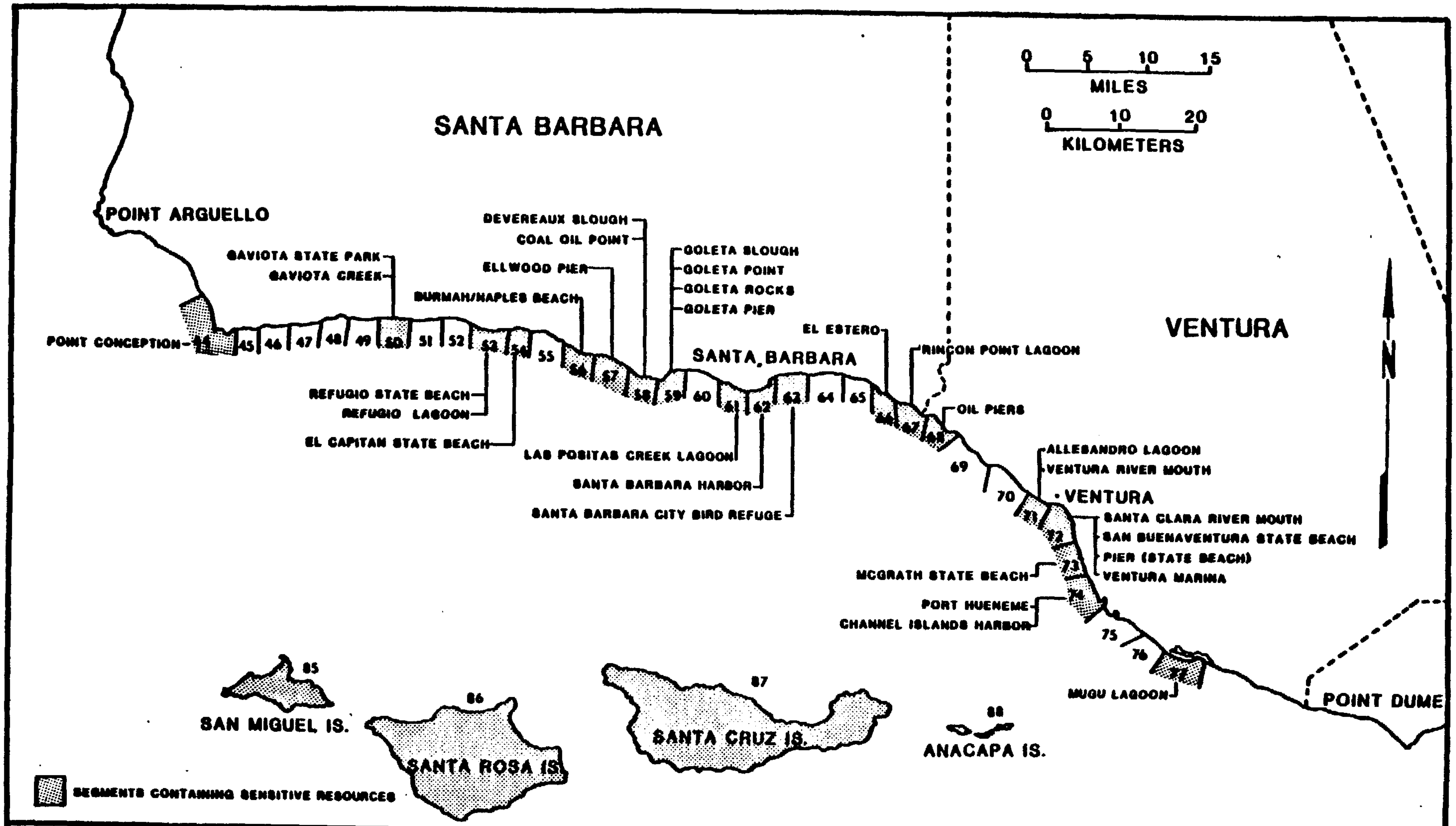


FIGURE II-2

SENSITIVE AREAS WITHIN CLEAN SEAS SEGMENTS BORDERING THE SANTA BARBARA CHANNEL

Table 700-25. POINT SAN LUIS

Shoreline Characteristics

General Description: rocky and marine terraces; narrow sand beach north of Port San Luis
Backshore: cliffs
Trafficability: fair on sand beaches

Cleanup Technique Code (2) and (3)

Access

Principal Entry Points: None north of US Coast Guard Station at Point San Luis; coastline is all private access.
Boat Launching Facilities: Pier at Port San Luis

Inlets/Streams

Inlets: None
Streams: Several high gradient intermittent creeks

Ownership and Control

Principal Property Owner(s):
Address:

(1)	(2)	(3)
Marre L. Land & Cattle Co. c/o Marre Ranch Avila Beach, CA 93424	U.S. Coast Guard	Port of San Luis

Phone:
Controlling Government Authority: 1) State of California 2) Federal
Waterfront Usage: Natural north of Coast Guard Station, recreational to the south

Biological Data

Potential Threat to Wildlife: Seals
Special Biological Significance: CC identifies the coastline area as one containing several seal rookeries. Harbor seals and California sea lions have been observed hauling out in an area one mile north of San Luis Obispo Lighthouse (Mate, 1977).

Seasonal Factors

Special Factors Affecting Spill Control

West side of San Luis Obispo Bay may impound oil. Other areas are high energy environments and should undergo rapid natural cleaning.

Comments

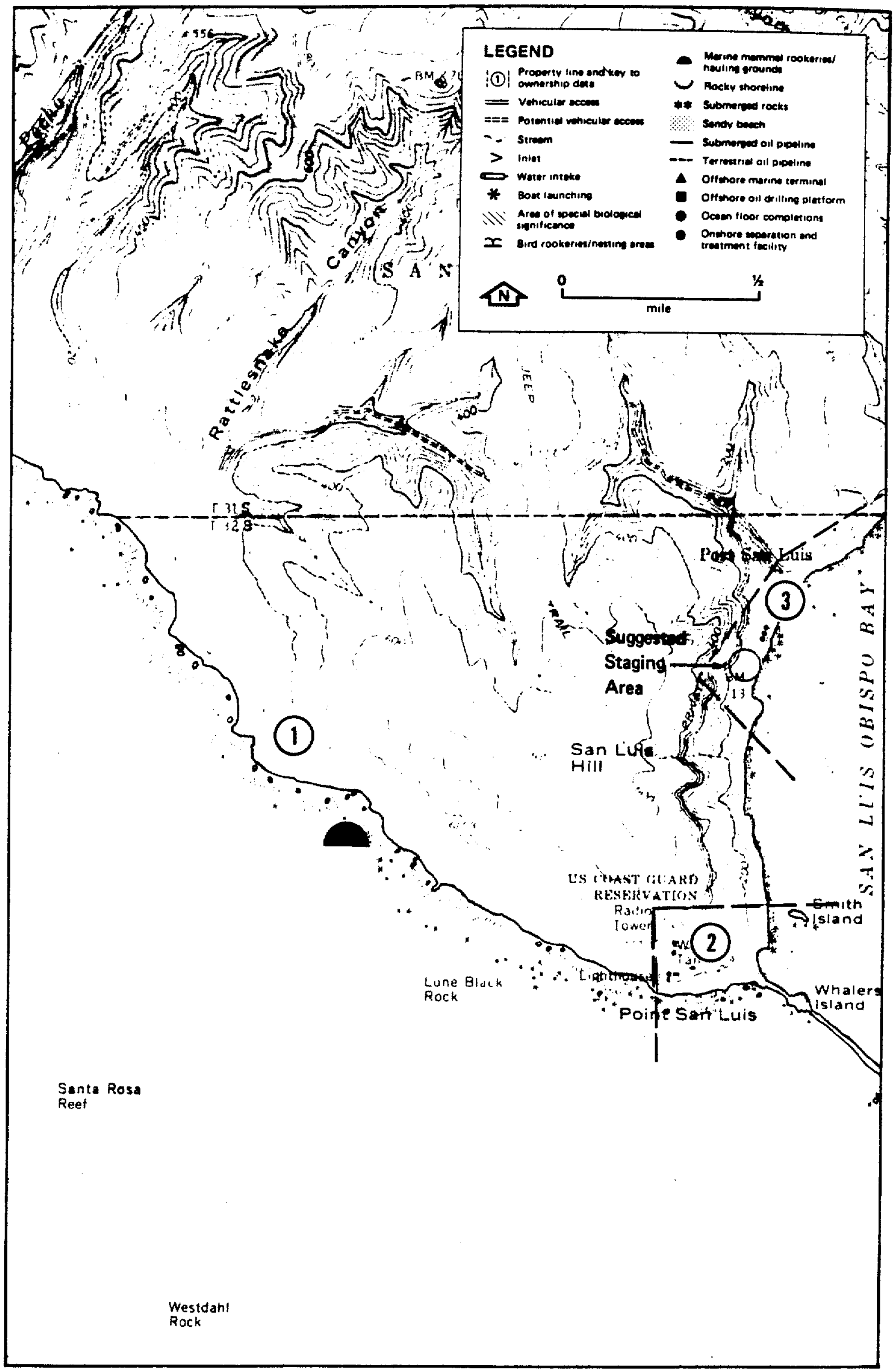


Figure 700-25. POINT SAN LUIS

Table 700-26. AVILA BEACH

Shoreline Characteristics
General Description: A) sandy beach, B) rocky shoreline at base of cliffs with small coarse sand pocket beaches. Large sandy beach at Mallagh Landing (locally known as Pirate's Cove). Entrance at Port San Luis Harbor.
Backshore: A) low ledges, B) cliffs
Trafficability: fair at Avila State Beach

Cleanup Technique Code
(2) and (3): Temporary disposal site at Avila Beach parking area

Access
Principal Entry Points: A) almost anywhere, B) road to area above cliffs but no safe access; potential vehicle access at Mallagh Landing
Boat Launching Facilities: Avila Beach, Union Oil pier

Inlets/Streams
Inlets: None
Streams: CC identifies San Luis Obispo Creek as an anadromous fish stream.

Ownership and Control
Principal Property Owner(s):

Address:

(1) Port San Luis Harbor Dist.	(2) Union Oil Co. of California Union Oil Building LA, CA 90017	(3) Luigi Marre Land & Cattle Avila, California
(4) State of California	(5) Macdonald, HF 4459 AVOCADO OFF. #102 LA, CA 90027	(6) Unknown

Phone:
Controlling Government Authority: 1) Port of San Luis 2) State of Calif.
Waterfront Usage: Recreation

Biological Data
Potential Threat to Wildlife: seals - hauling out area at Mallagh Landing
Special Biological Significance: productive San Luis Obispo Creek Estuary

Seasonal Factors
Beaches subject to seasonal on- and offshore sand migration

Special Factors Effecting Spill Control
San Luis Obispo Creek Estuary subject to tidal action. High potential for oil intrusion (see Map 700-2 at end of section for special booming procedures); rocky areas are high energy environments - should self-clean naturally.

Comments
Boom creek at or landward of bridge - avoid sandbars. Monitor for seals, persistent oil accumulations west end Mallagh Landing.

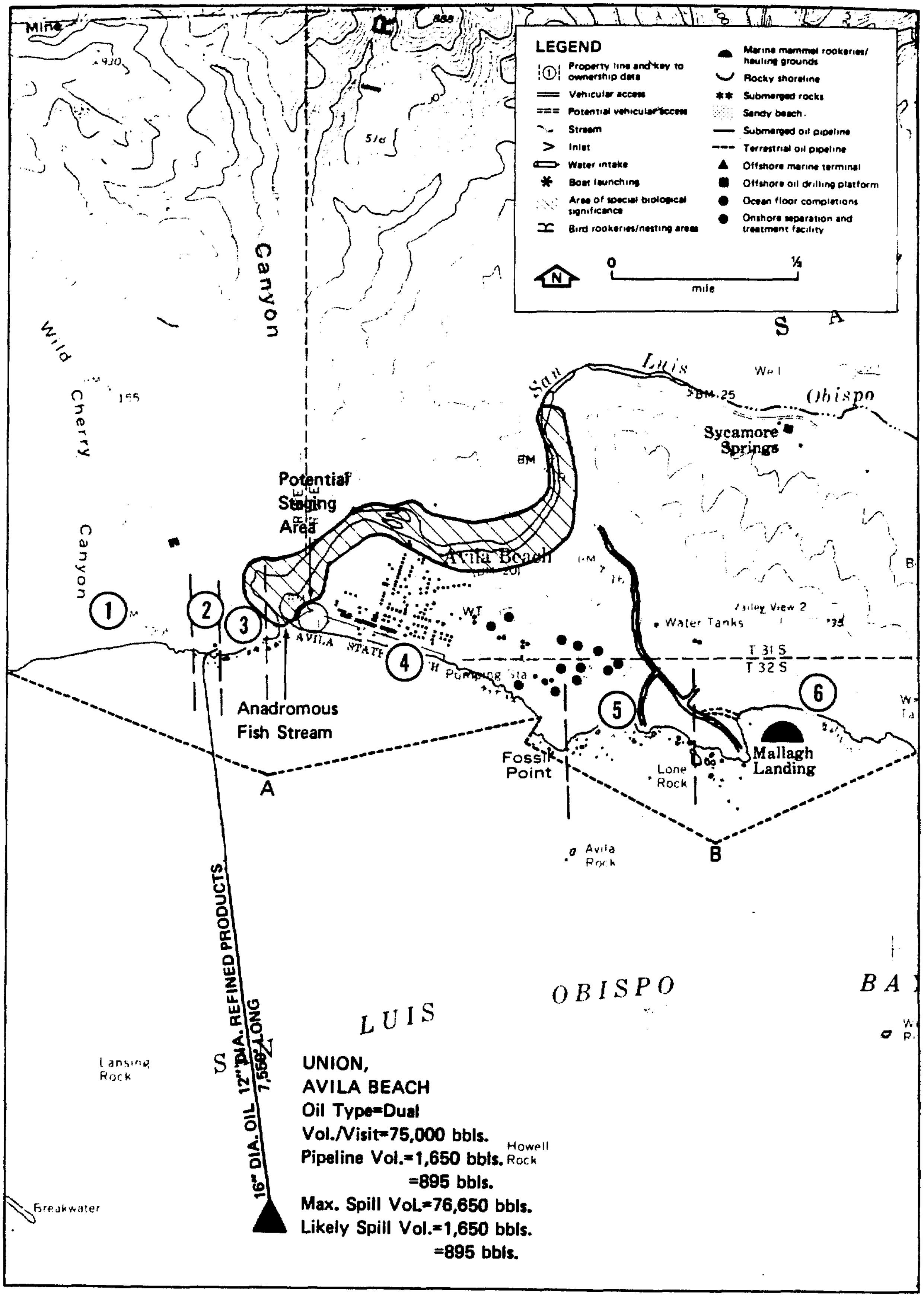


Figure 700-26. AVILA BEACH

Table 700-27. SHELL BEACH

Shoreline Characteristics

General Description: A and C) predominantly rocky shoreline and marine terraces with small pocket beaches; B) sandy beaches
Backshore: low cliffs
Trafficability: good on sandy beaches

Cleanup Technique Code

(3) at B; (4) A and C

Access

Principal Entry Points: A and C) limited foot access; B) from streets as indicated
Boat Launching Facilities: None Nearest: Pismo Beach

Inlets/Streams

Inlets: None
Streams: several intermittent creeks

Ownership and Control

Principal Property Owner(s): Unknown

Address:
Phone:
Controlling Government Authority:
Waterfront Usage: Natural

Biological Data

Potential Threat to Wildlife:
Special Biological Significance:

Seasonal Factors

Sandy areas may move on- and offshore seasonally.

Special Factors Affecting Spill Control

High energy environment - high rate of natural cleaning expected

Comments

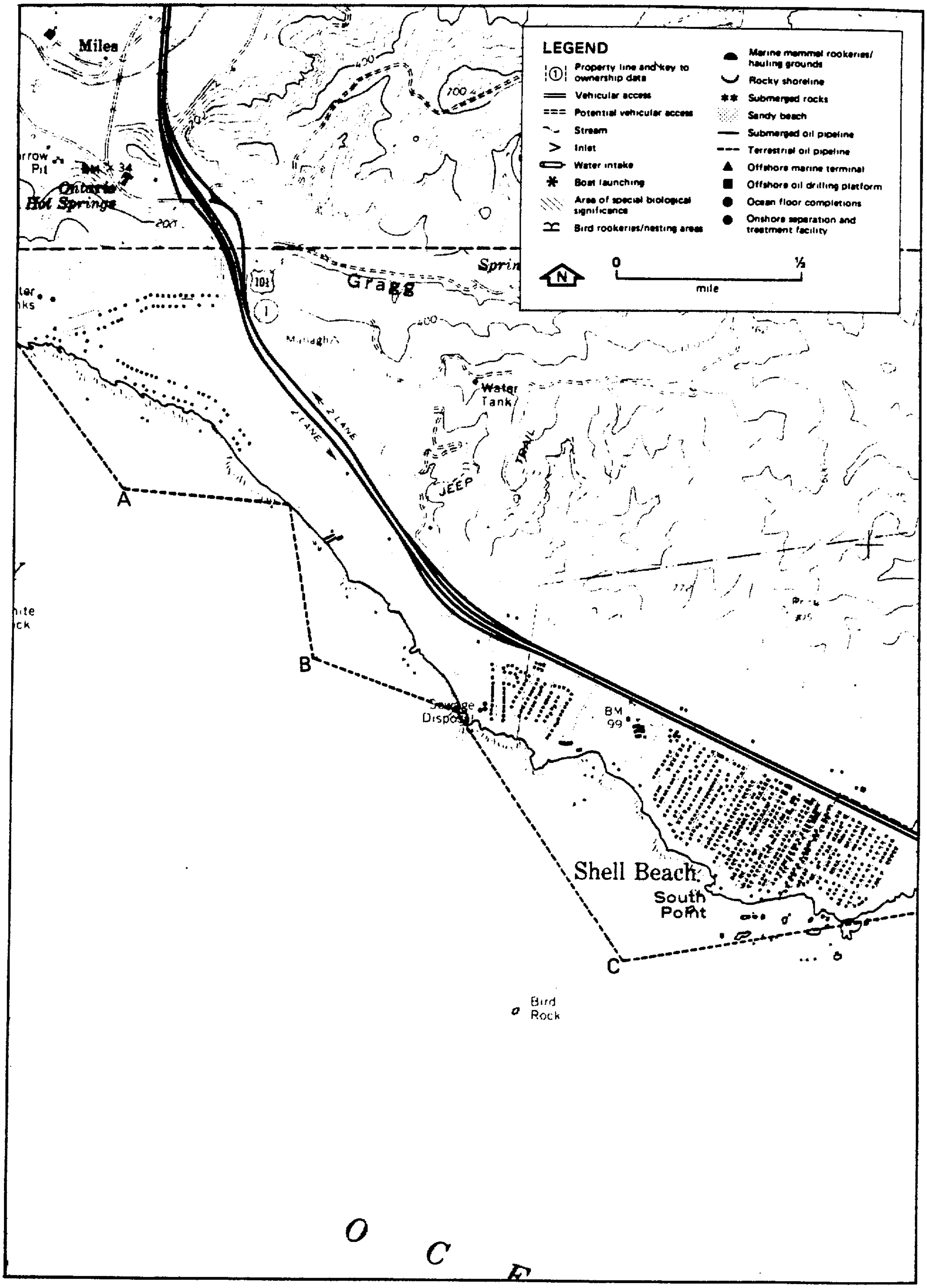


Figure 700-27. SHELL BEACH

Table 700-28. PISMO BEACH

Shoreline Characteristics

General Description: A) rocky shoreline and marine terrace. The rest of the shoreline is wide, sandy beach.
Backshore: A) cliffs B) dunes
Trafficability: Excellent; firm sand in beach area

Cleanup Technique Code

(3) temporary disposal site at Pismo Beach parking area

Access

Principal Entry Points: A) no access B) direct access at foot of Grand Ave., Grover City and at Pismo Beach
Boat Launching Facilities: Pismo pier

Inlets/Streams

Inlets: None
Streams: CC identifies Pismo Creek as an anadromous fish stream

Ownership and Control

Principal Property Owner(s): 1) Unknown 2) State of California

Address:
Phone:
Controlling Government Authority: State of California
Waterfront Usage: Recreation

Biological Data

Potential Threat to Wildlife: Anadromous fish, surf clams
Special Biological Significance: Meadow Creek wetland area

Seasonal Factors

Sand can be expected to move on- and offshore seasonally.

Special Factors Affecting Spill Control

Entrance to Pismo Creek generally closed by bar

Comments

Monitor bar at entrance to Pismo Creek. If open boom lagoon at interior area where water velocity drops. Beach cleanup efforts should cause minimal disturbance in lower intertidal (clam) areas; concentrate effort on high tide deposits.

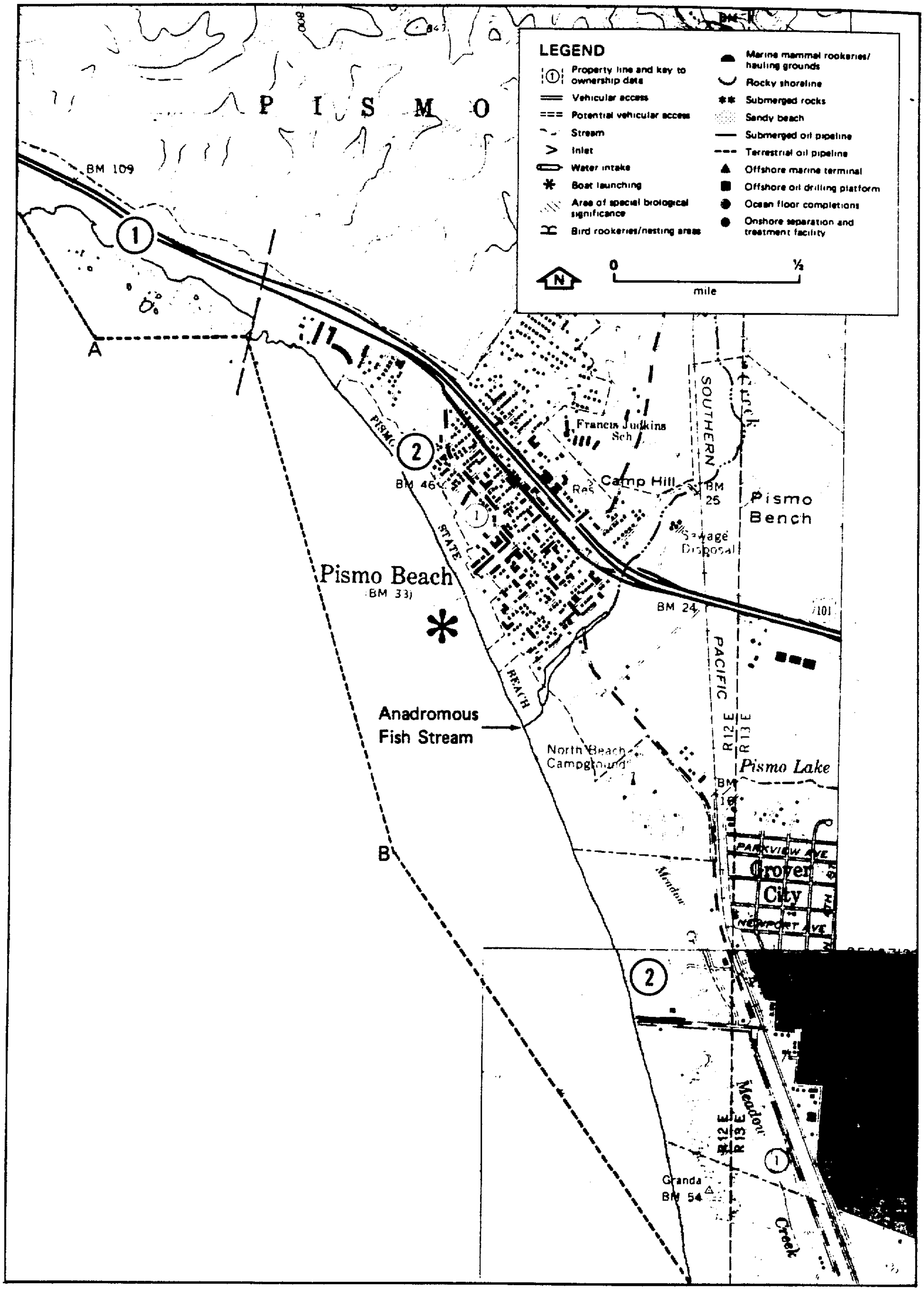


Figure 700-28. PISMO BEACH

Table 700-29. OCEANO

Shoreline Characteristics

General Description: wide sandy beach
Backshore: primarily sand dunes
Trafficability: good; backshore dunes may be impassable to mechanized cleanup equipment without construction of road

Cleanup Technique Code

(3) temporary disposal site at Pismo Beach parking areas

Access

Principal Entry Points: west of Oceano Airport
Boat Launching Facilities: None Nearest: Pismo Beach

Inlets/Streams

Inlets: None
Streams: CC identifies Arroyo Grande Creek as an anadromous fish stream.

Ownership and Control

Principal Property Owner(s): State of California

Address:
Phone:
Controlling Government Authority: State of California
Waterfront Usage: Recreation

Biological Data

Potential Threat to Wildlife: anadromous fish, surf clams
Special Biological Significance: CC designates coastal area as part of a special marine environment and wetland.

Seasonal Factors

Entrance to Arroyo Grande Creek generally blocked by bar

Special Factors Affecting Spill Control

Culvert connecting the southern end of Oceano Lagoon to the main lagoon area can be closed preventing oil intrusion into that area. Beach cleanup efforts should minimize disturbance of lower intertidal (clam) zones. Concentrate on high tide deposits.

Comments

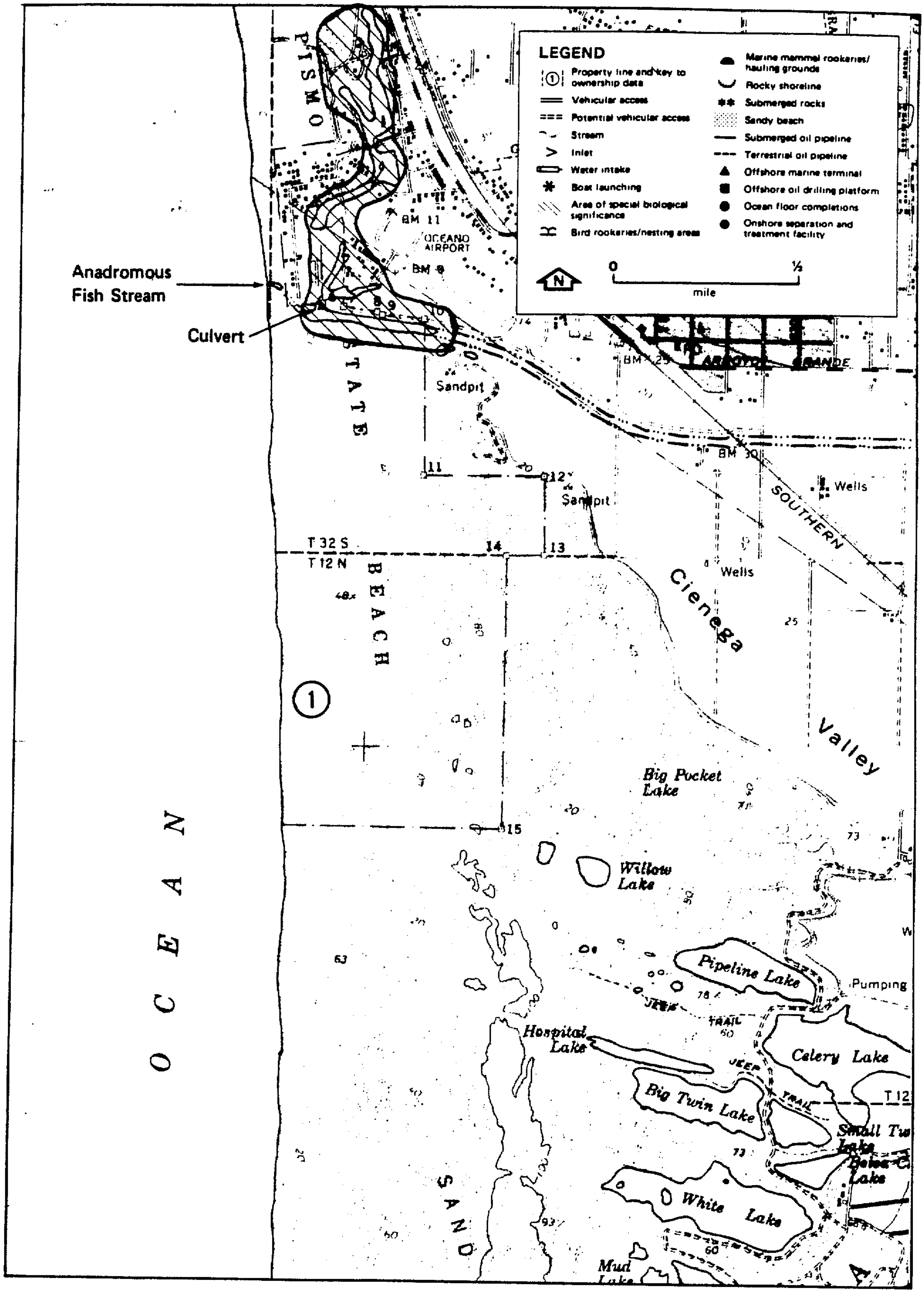


Figure 700-29.   OCEANO

Table 700-30. OSO FLACO LAKE

Shoreline Characteristics

General Description: wide sandy beach
Backshore: sand dunes
Trafficability: good on beach for most equipment

Cleanup Technique Code (3)

Access

Principal Entry Points: from the north at Oceano access point or potential access from Oso Flaco Lake road
Boat Launching Facilities: None Nearest: Pismo Beach

Inlets/Streams

Inlets: None
Streams: Oso Flaco Creek (could provide means to transport oil back to Oso Flaco Lake and wetlands)

Ownership and Control

Principal Property Owner(s):

Address:

(1) State of California	(2) Santa Maria Valley Assoc. c/o Sho Lino Accountants 3731 Wilshire Blvd. Ste. 601 LA, CA 90010	(3) Jackbilt, Inc. et.al. c/o GR Howard P. O. Box 6366 Burbank, CA 91510
(4) Mobil Oil Corp. 612 S. Flower LA, CA 90054		

Phone:
Controlling Government Authority:
Waterfront Usage: Recreation/natural

Biological Data

Potential Threat to Wildlife: surf clams
Special Biological Significance: CC designates coastal area as part of a special marine environment. Oso Flaco Lake and wetlands is a very productive area.

Seasonal Factors

Special Factors Affecting Spill Control

Comments

Beach cleanup should minimize disturbance of lower intertidal (clam) areas. Concentrate cleanup on high tide deposits.

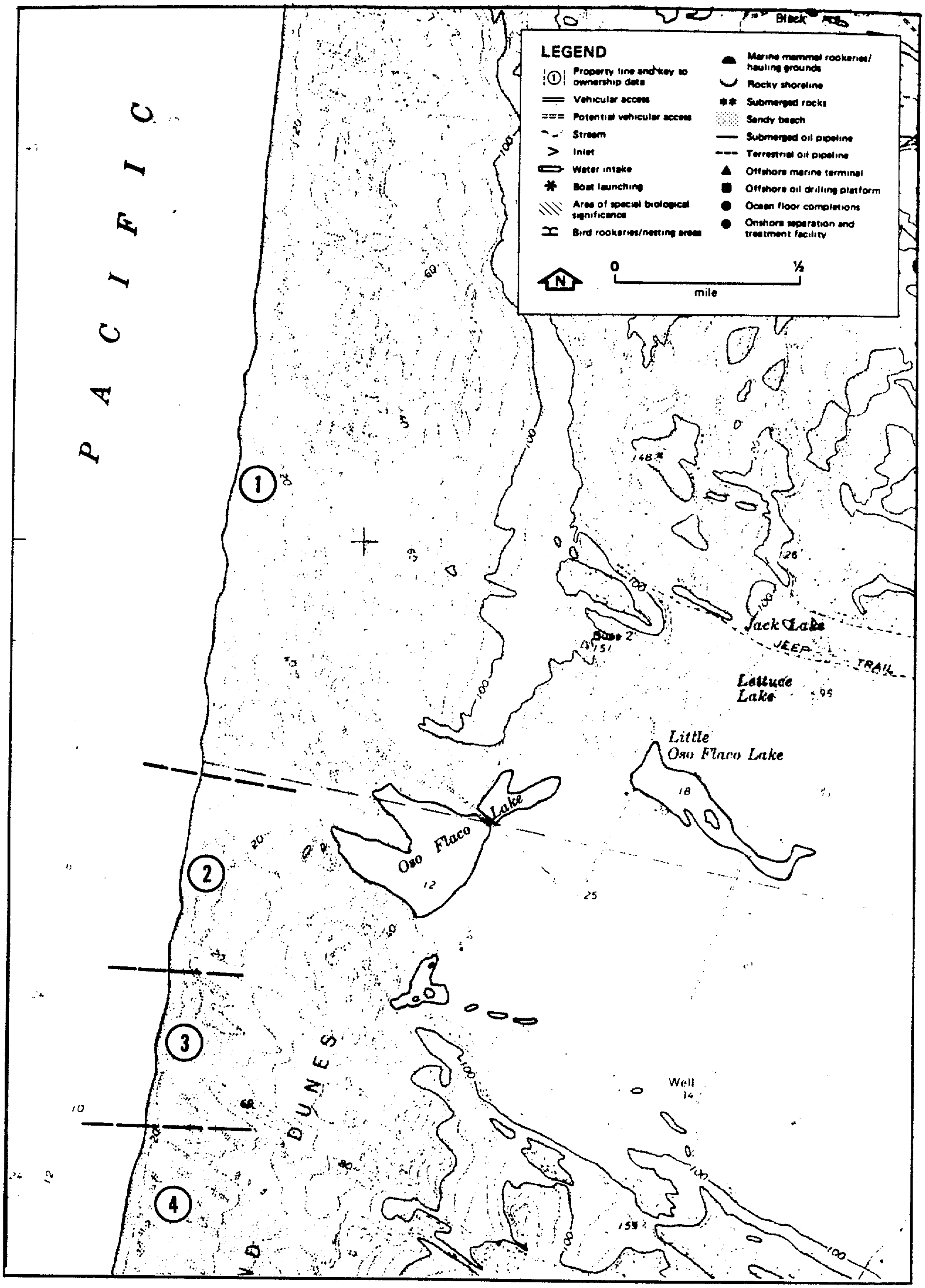


Figure 700-30. OSO FLACO LAKE

Table 700-31. GUADALUPE

Shoreline Characteristics

General Description: wide sandy beach
Backshore: sand dunes
Trafficability: Good; sand dunes may be impassable to cleanup equipment.

Cleanup Technique Code (3)

Access

Principal Entry Points: potential private access from Guadalupe oil field, from north along beach
Boat Launching Facilities: None Nearest: Pismo Beach

Inlets/Streams

Inlets: None
Streams: Santa Maria River

Ownership and Control

Principal Property Owner(s):

Address:	(1)	(2)	(3)
	Mobil Oil Corp.	Wells Fargo Bank (Leroy)	Union Sugar Co.
	612 S. Flower	464 California St.	P. O. Box Z
	LA, CA 90054	San Francisco, CA	Betteravia, CA
Phone:		(415) 396-0123	(805) 925-8633

Controlling Government Authority: State of California
Waterfront Usage: Recreation

Biological Data

Potential Threat to Wildlife: surf clams, Santa Maria River wetlands
Special Biological Significance: CC designates coastal area as part of a special marine environment, Santa Maria River wetlands.

Seasonal Factors

Sandy beaches will migrate on- and offshore seasonally.

Special Factors Affecting Spill Control

The mouth of the Santa Maria River is normally closed by sand bar.

Comments

Monitor entrance to Santa Maria River for adequate bar development. If inadequate, reinforce bar or boom landward.

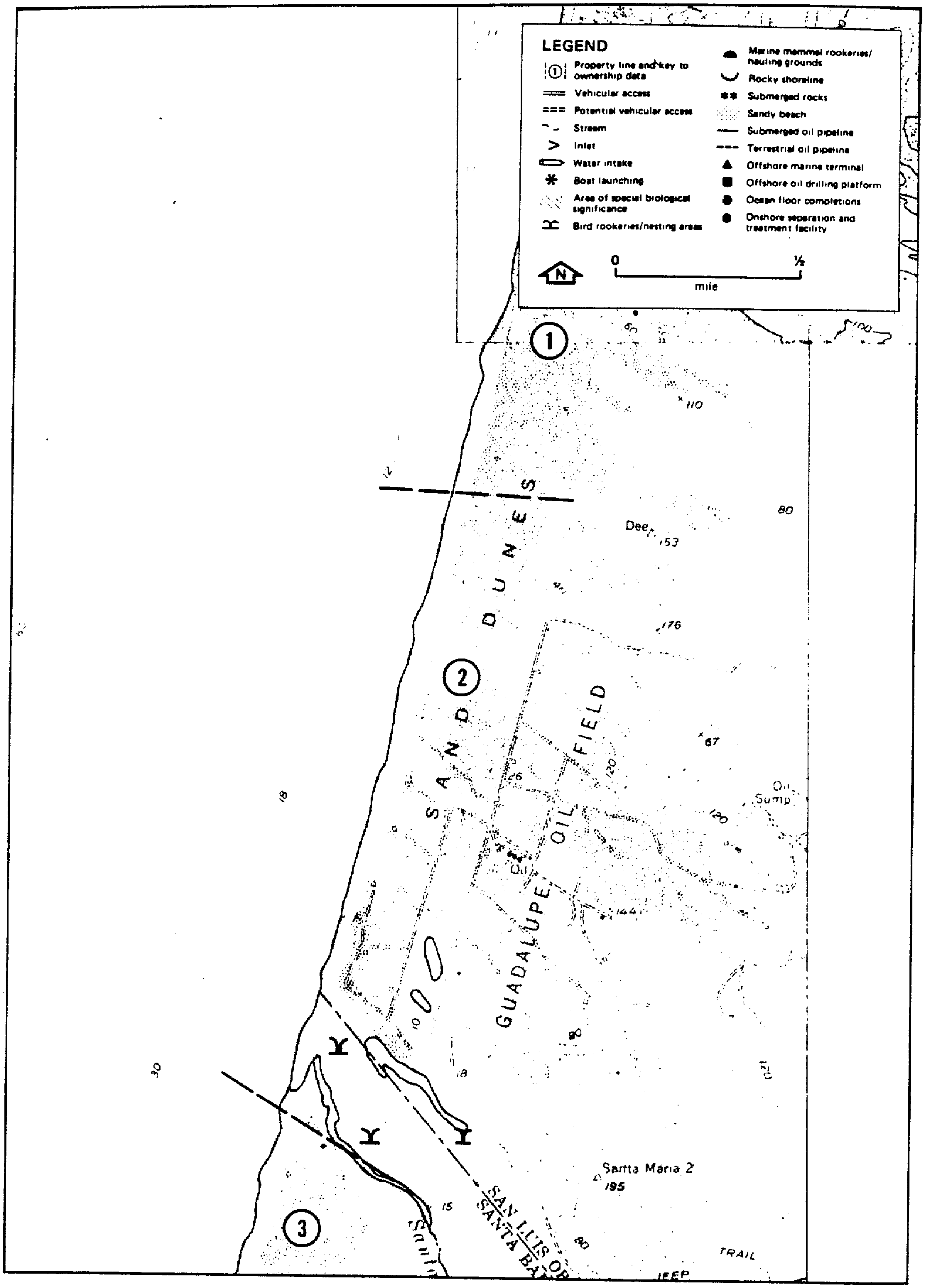


Figure 700-31. GUADALUPE

Table 700-32. MUSSEL POINT

Shoreline Characteristics

General Description: wide sandy beach, some rocks at Mussel Point
Backshore: sand dunes with cliffs at Mussel Point
Trafficability: Beach good; dunes may be impassable to cleanup equipment.

Cleanup Technique Code (3)

Access

Principal Entry Points: Possibly south from Guadelupe Oil field
Boat Launching Facilities: None Nearest: Pismo Beach

Inlets/Streams

Inlets: None
Streams: Intermittent creek south of Mussel Point

Ownership and Control

Principal Property Owner(s):

Address:

(1)	(2)	(3)	(4)
Union Sugar Co.	Gordon, Macetta	Wells Fargo Bank	Tognazzini Mercedes
P. O. Box Z	1223 Gibson Lane	(Leroy)	402 Edward Street
Betteravia, CA	Santa Maria, CA	464 California St.	Santa Maria, CA
		San Francisco, CA	

Phone:

(805) 925-8633	(805) WA2-5918	(415) 396-0123	(805) WA5-3326

Controlling Government Authority: State of California
Waterfront Usage: limited recreation

Biological Data

Potential Threat to Wildlife:
Special Biological Significance: CC designates the coastal area as part of a special marine environment.

Seasonal Factors

Sand beaches may move on- and offshore seasonally.

Special Factors Affecting Spill Control

Comments

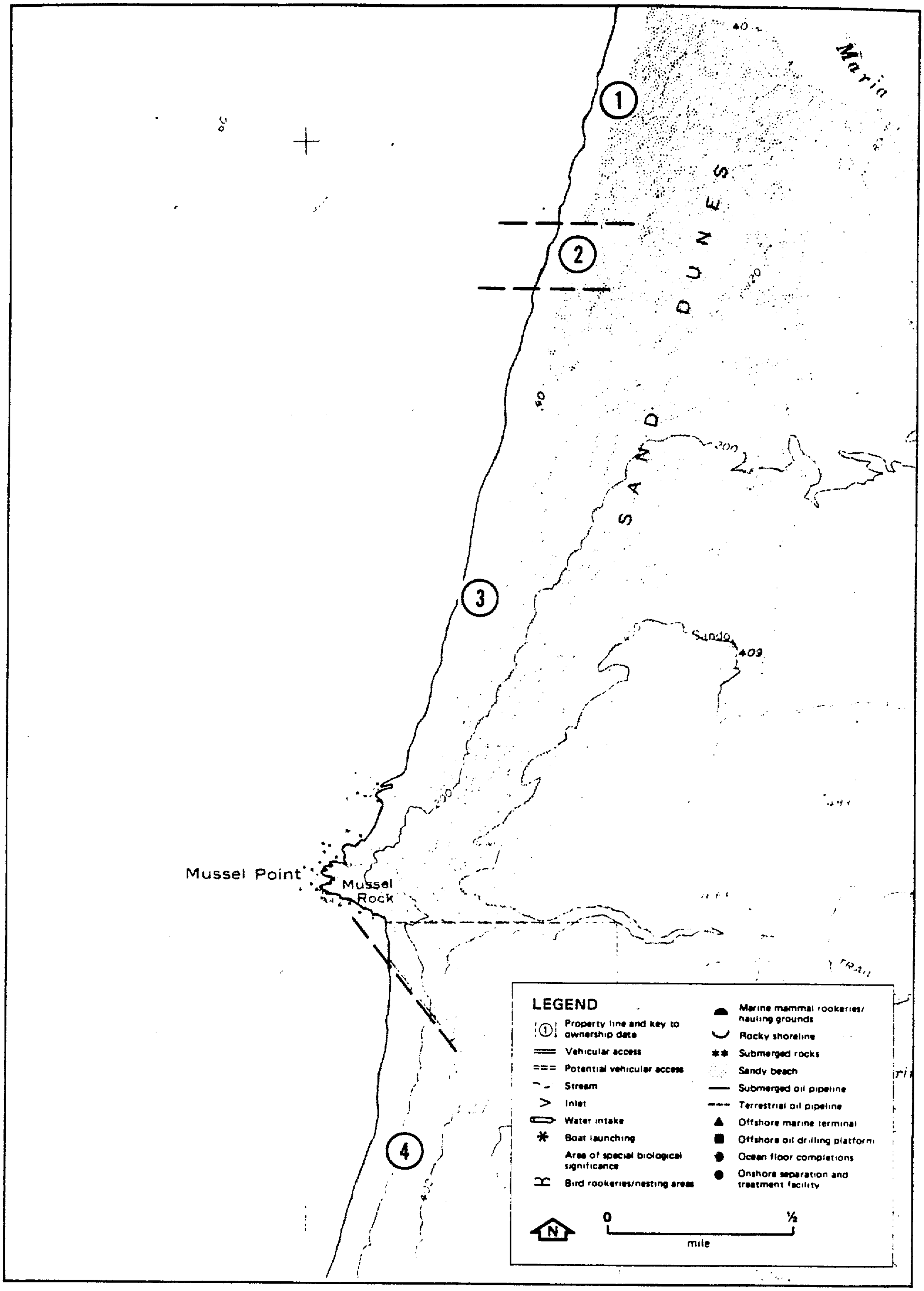


Figure 700-32. MUSSEL POINT

Table 700-33. POINT SAL

Shoreline Characteristics
General Description: A) flat, sandy beaches B) irregular rocky shoreline and marine terraces C) sandy beach; some rocks D) rocky shoreline
Backshore: A) sandy cliffs B) rocky cliffs C) rocky bluffs D) rocks and marine terrace
Trafficability: unknown on sand beaches

Cleanup Technique Code
(3) A and C; (4) B and D: temporary disposal site at beach parking area

Access
Principal Entry Points: Point Sal Beach State Park via Point Sal Road
Boat Launching Facilities: None Nearest: Surf

Inlets/Streams
Inlets: None
Streams: None

Ownership and Control
Principal Property Owner(s):

Address:	(1)	(2)	(3)
	Field Oil Co. Palos Verdes Est. Palos Verdes, CA	U.S. Government Dept.	Kelly-Moore Paint 1015 Commercial St. San Carlos, CA
Phone:	Unlisted	Unknown	(415) 592-8337
	(4)	(5)	(6)
	State of California	Leroy, E. and A. c/o Wells Fargo Bank 464 California St. San Francisco, CA	Vandenberg Air Force Base Vandenberg, CA
Phone:		(415) 396-0123	(805) 866-1611

Controlling Government Authority: State of California, Federal Government
Waterfront Usage: recreation, natural

Biological Data
Potential Threat to Wildlife:
Special Biological Significance: CC designates the coastal area as part of a special marine environment. Seal haul out at Pt. Sal

Seasonal Factors
Sandy beaches may move on- and offshore seasonally.

Special Factors Affecting Spill Control
Rocky areas are high energy environments and should undergo rapid natural cleaning.

Comments

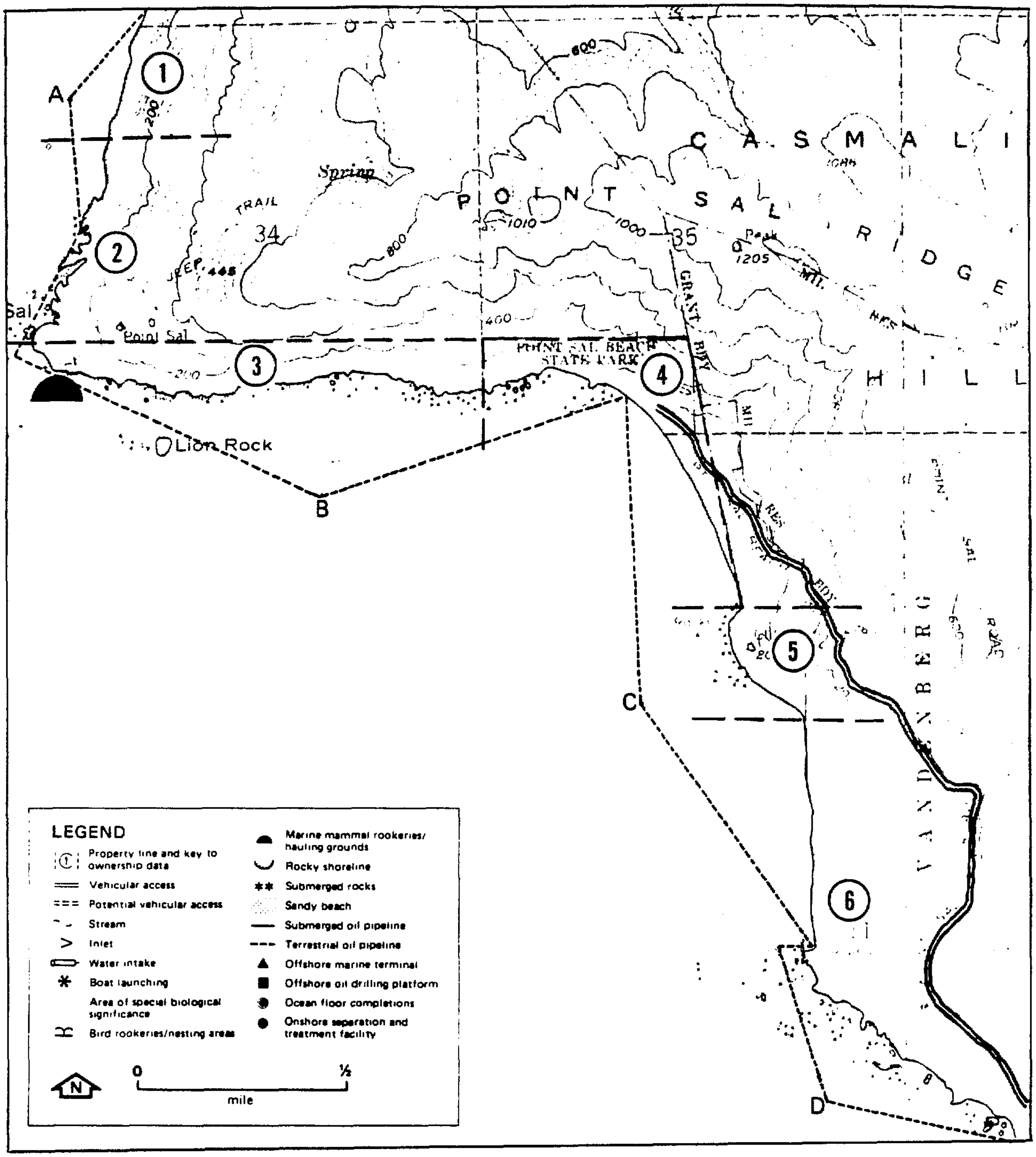


Figure 700-33. POINT SAL

Table 700-34. LIONS HEAD

Shoreline Characteristics

General Description: A) rocks and marine terrace B) sandy beach
Backshore: A) low cliffs B) sand dunes
Trafficability: Sandy areas should be passable; dunes probably impassable to cleanup equipment.

Cleanup Technique Code: (4): potential temporary disposal site at suggested staging area

Access

Principal Entry Points: controlled access at Casmalia Road off Point Sal Road
Boat Launching Facilities: None Nearest: Surf

Inlets/Streams

Inlets: None
Streams: several intermittent creeks in rock area

Ownership and Control

Principal Property Owner(s):

Address: Vandenburg Air Force Base
Vandenburg, California
Phone: (805) 866-1611
Controlling Government Authority: Department of Defense
Waterfront Usage: U.S. Air Force Missile Center

Biological Data

Potential Threat to Wildlife:
Special Biological Significance: CC designates the coastal area as part of a special marine environment.

Seasonal Factors

Sandy beaches may migrate on- and offshore seasonally.

Special Factors Affecting Spill Control

Rocky areas are high energy environments and should self-clean rapidly.

Comments

Sandy beaches are probable surf clam habitats as such operation in lower intertidal should be avoided and efforts concentrated on high tide deposits.

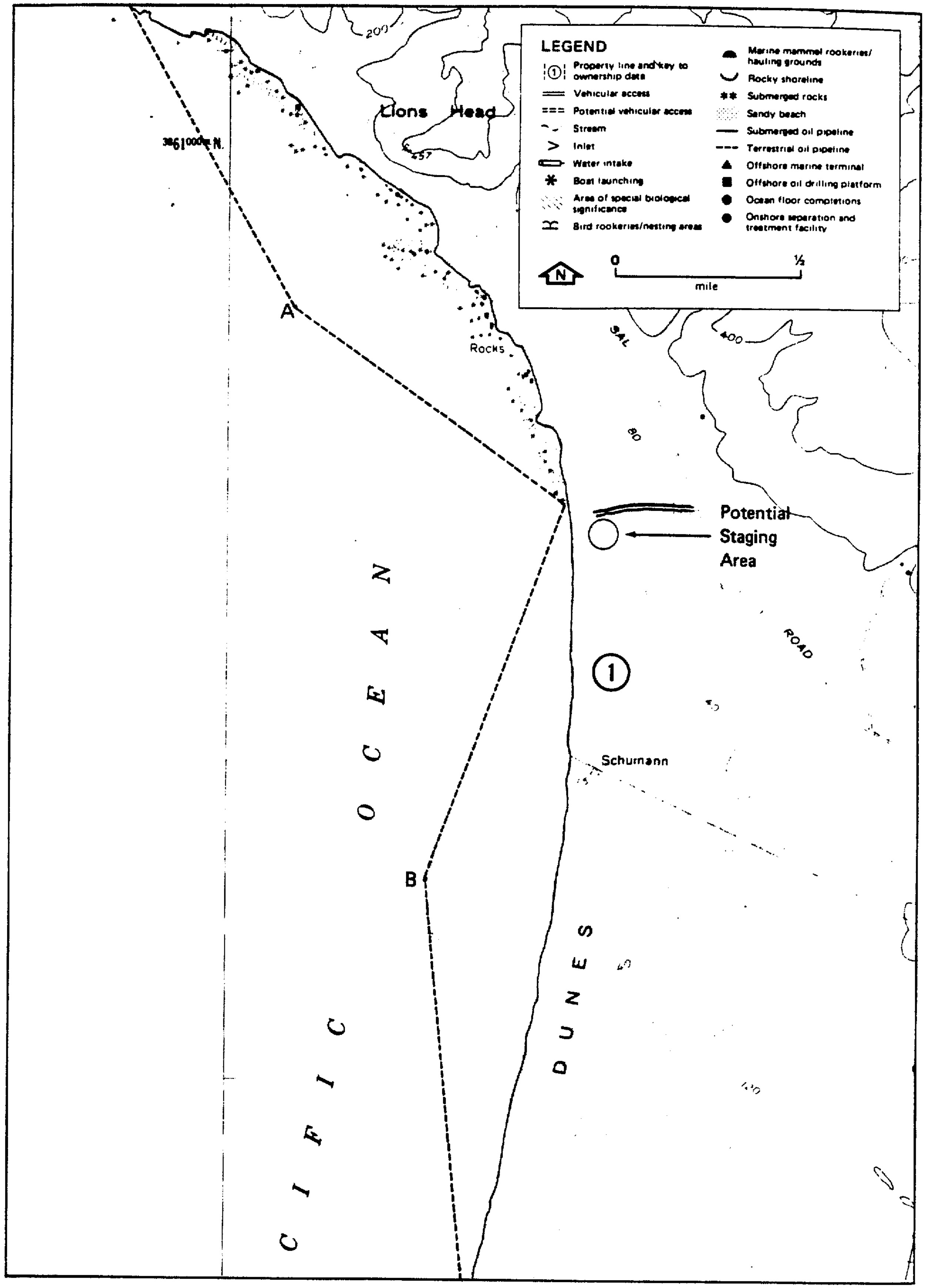


Figure 700-34. LIONS HEAD

Table 700-35. VANDENBURG

Shoreline Characteristics

General Description: sandy beach
Backshore: sand dunes
Trafficability: Beaches should be passable; dunes probably impassable to cleanup equipment.

Cleanup Technique Code: (4)

Access

Principal Entry Points: from north and south along beach
Boat Launching Facilities: None Nearest: Surf

Inlets/Streams

Inlets: None
Streams: San Antonio Creek

Ownership and Control

Principal Property Owner(s):

Address: Vandenburg Air Force Base
Vandenburg, California
Phone: (805) 866-1611
Controlling Government Authority: Department of Defense
Waterfront Usage: Natural

Biological Data

Potential Threat to Wildlife:
Special Biological Significance: CC designates the coastal area as part of a special marine environment.

Seasonal Factors

Sandy beaches may migrate on- and offshore seasonally. Entrance to San Antonio Creek commonly closed by bar.

Special Factors Affecting Spill Control

Comments

Monitor entrance to San Antonio Creek; institute control action if bar not developed.

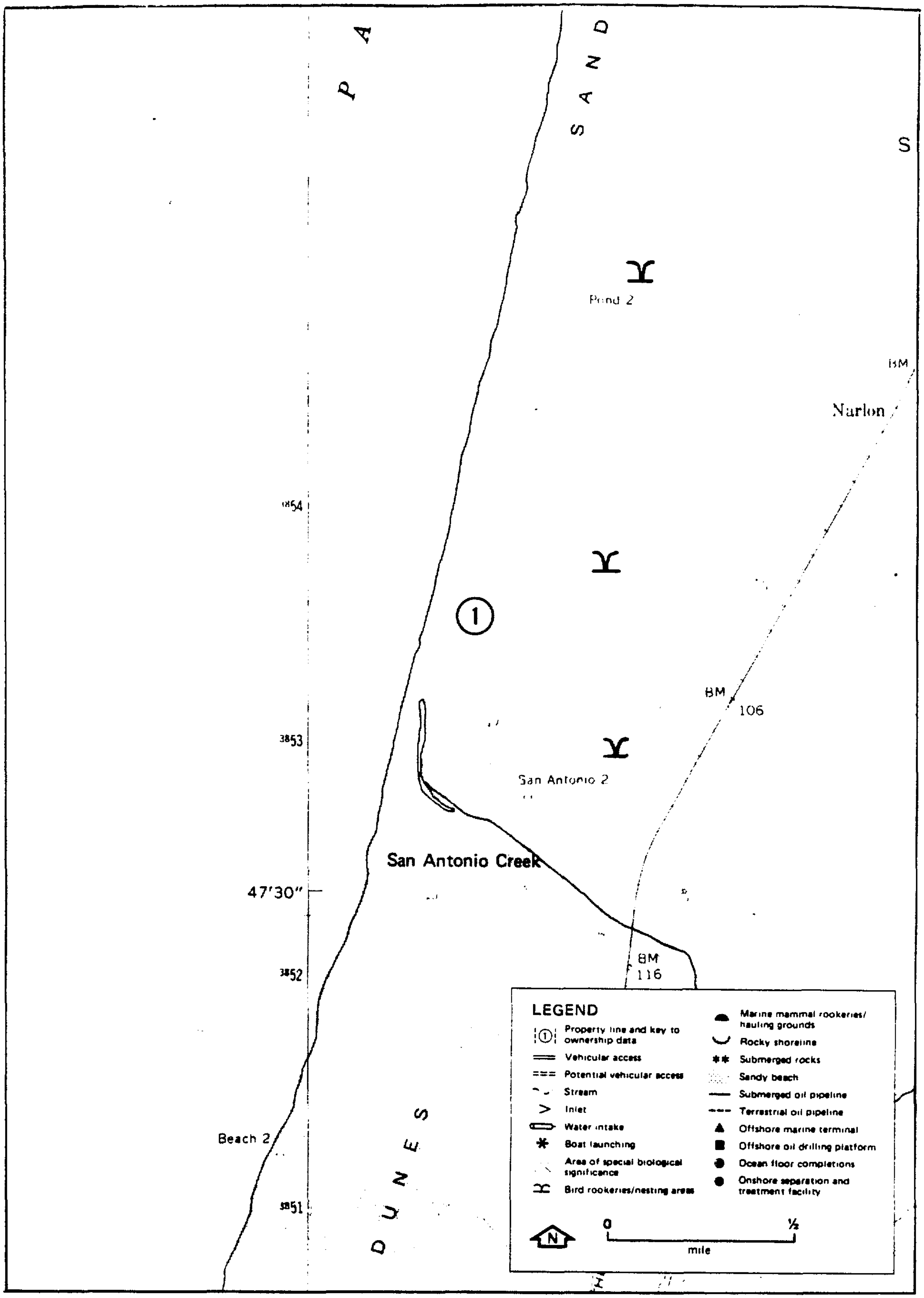


Figure 700-35. VANDENBERG

Table 700-36. PURISIMA POINT

Shoreline Characteristics

General Description: mostly rocky with marine terraces
Backshore: sand dunes or rocky cliffs
Trafficability: undetermined

Cleanup Technique Code: (4)

Access

Principal Entry Points: Ord Road off Tangier Road or Coast Road out of Lompoc Landing; both lead from Vandenberg A.F.B.
Boat Launching Facilities: None Nearest: Surf

Inlets/Streams

Inlets: None
Streams: None

Ownership and Control

Principal Property Owner(s):

Address: Vandenburg Air Force Base
Vandenburg, California
Phone: (805) 866-1611
Controlling Government Authority: Department of Defense
Waterfront Usage: Natural

Biological Data

Potential Threat to Wildlife:
Special Biological Significance: CC designates the coastal area as part of a special marine environment (CC, p. 369).

Seasonal Factors

Special Factors Affecting Spill Control

High energy environment high rates of natural cleaning can be expected in most areas.

Comments

Accumulations in "lee" of Purisima Point may be more persistent than other areas.

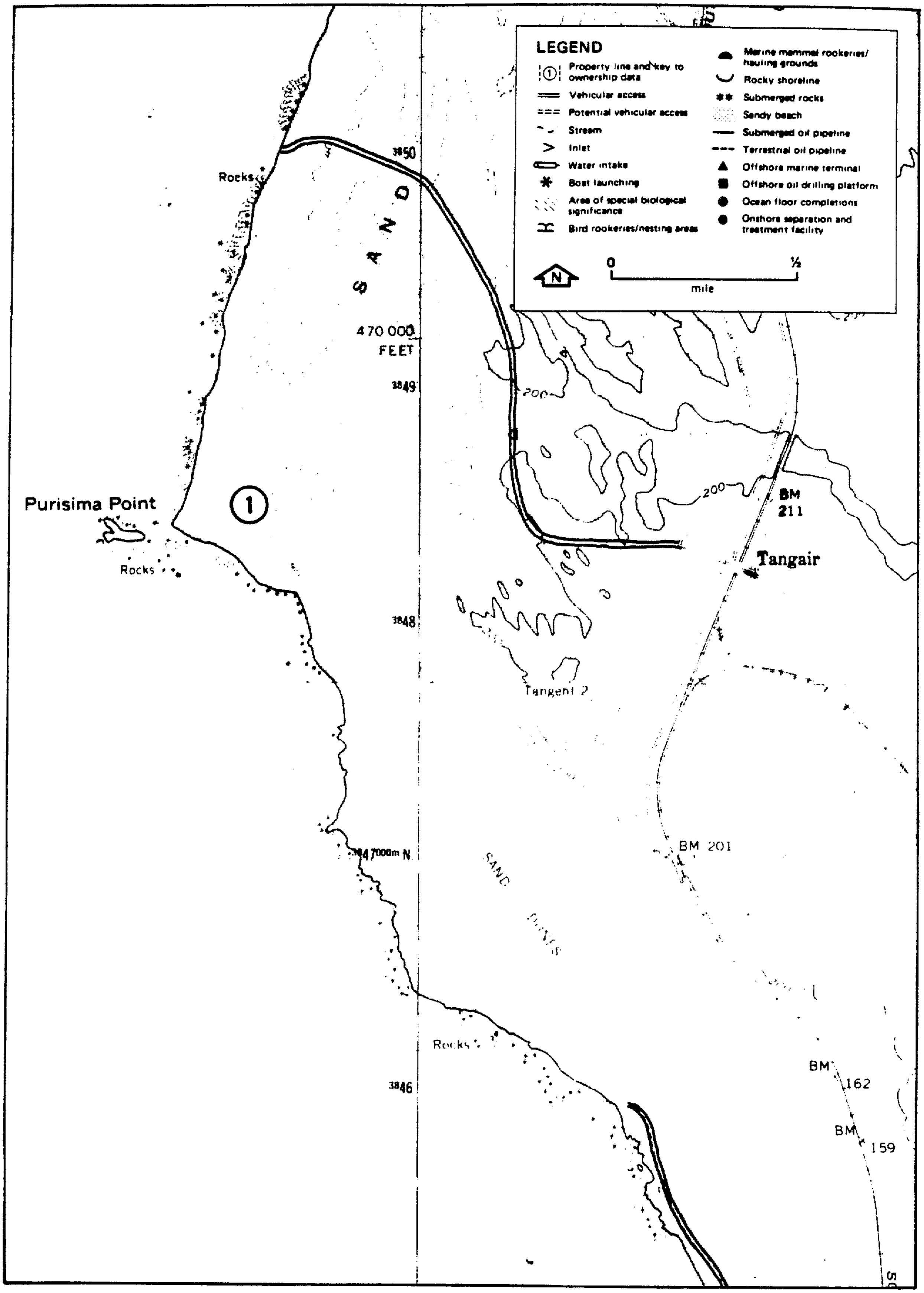


Figure 700-36. PURISIMA POINT

Table 700-37. LOMPOC LANDING

Shoreline Characteristics

General Description: Mostly rocky to the north giving way to low, flat, sandy beach with tidal ponds at Santa Ynez River.
Backshore: sand dunes or rocky cliffs to the north; sandy area to the south
Trafficability: good - firm sand

Cleanup Technique Code

(4 and 3 for park beach): temporary disposal site at beach parking area

Access

Principal Entry Points: Surf road and/or Lompoc Landing Road. Surf road unimproved and steep; requires RR crossing. Boat access at state park.
Boat Launching Facilities: ramp at county park

Inlets/Streams

Inlets: None
Streams: Santa Ynez River

Ownership and Control

Principal Property Owner(s):

Address:	(1)	(2)
	Vandenberg Air Force Base	County of Santa Barbara
	Vandenberg, California	Ocean or Surf Beach Park
Phone:	(805) 866-1611	(805) RE6-6693

Controlling Government Authority: Dept. of Defense & County Parks & Rec.
Waterfront Usage: Santa Ynez estuary is natural area.

Biological Data

Potential Threat to Wildlife: Numerous birds in Santa Ynez River wetlands
Special Biological Significance: CC designates Santa Ynez River wetlands and estuary and coastal area as part of a special marine environment.

Seasonal Factors

Entrance to Santa Ynez River commonly barred - inlet could open up at certain times of year.

Special Factors Affecting Spill Control

High currents will restrict booming seaward of RR trestle crossing estuary.

Comments

Monitor entrance to estuary for development of bar.

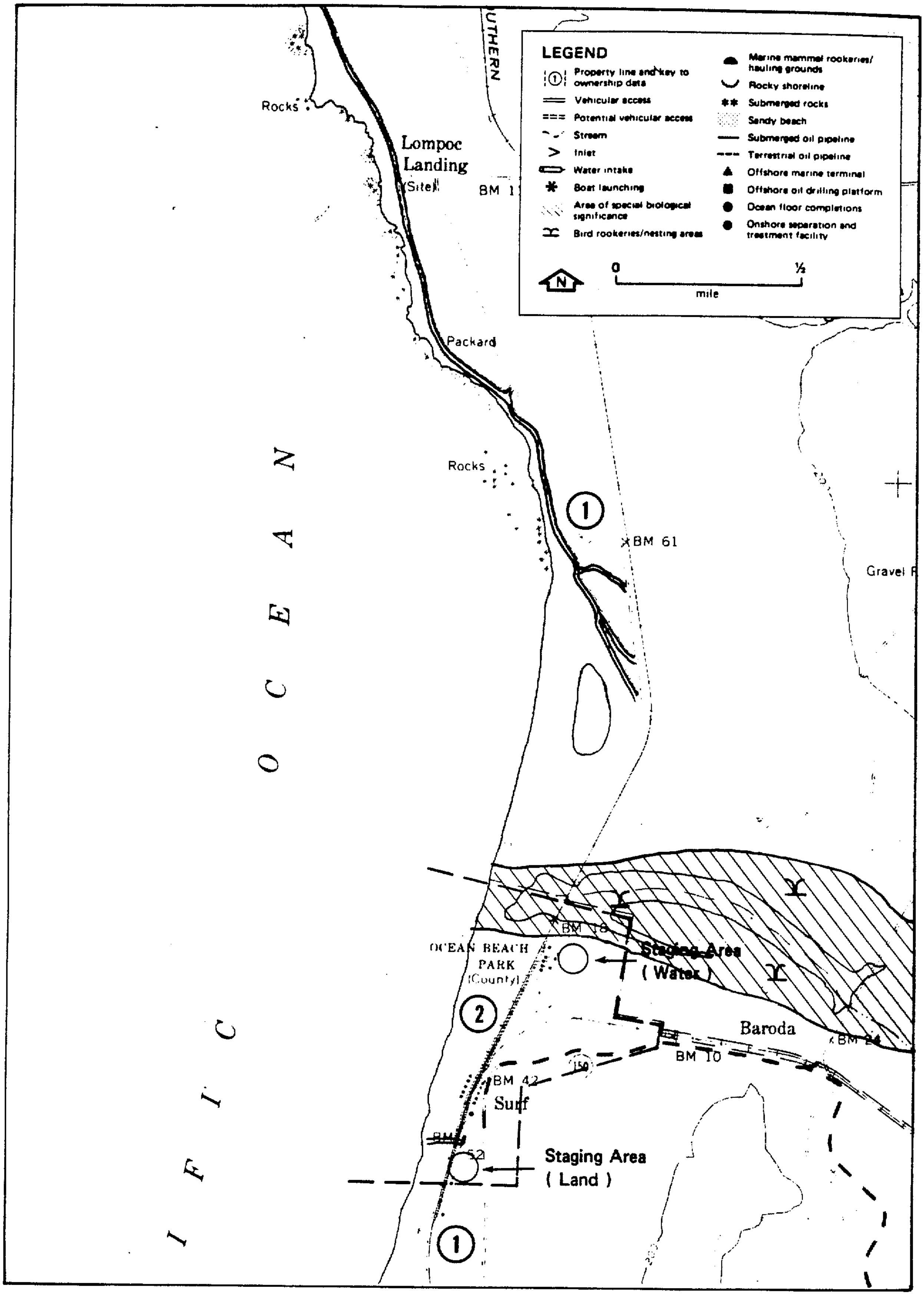


Figure 700-37. LOMPOC LANDING

Table 700-38. SPRING CANYON

Shoreline Characteristics

General Description: low, flat and sandy beach narrowing towards the south
Backshore: steep cliffs
Trafficability: fair to good on intertidal area of beach

Cleanup Technique Code: (4)

Access

Principal Entry Points: from surf/ocean beach park along coast road; access controlled by gate onto military reservation
Boat Launching Facilities: None   Nearest: Surf

Inlets/Streams

Inlets: None
Streams: several intermittent creeks

Ownership and Control

Principal Property Owner(s):

Address: (1)
Vandenburg Air Force Base
Vandenburg, California
Phone: (805) 866-1611
Controlling Government Authority: Department of Defense
Waterfront Usage: Natural

Biological Data

Potential Threat to Wildlife:
Special Biological Significance: CC designates the coastal area as part of a special marine environment.

Seasonal Factors

Special Factors Affecting Spill Control

Sandy beaches may migrate on- and offshore seasonally.

Comments

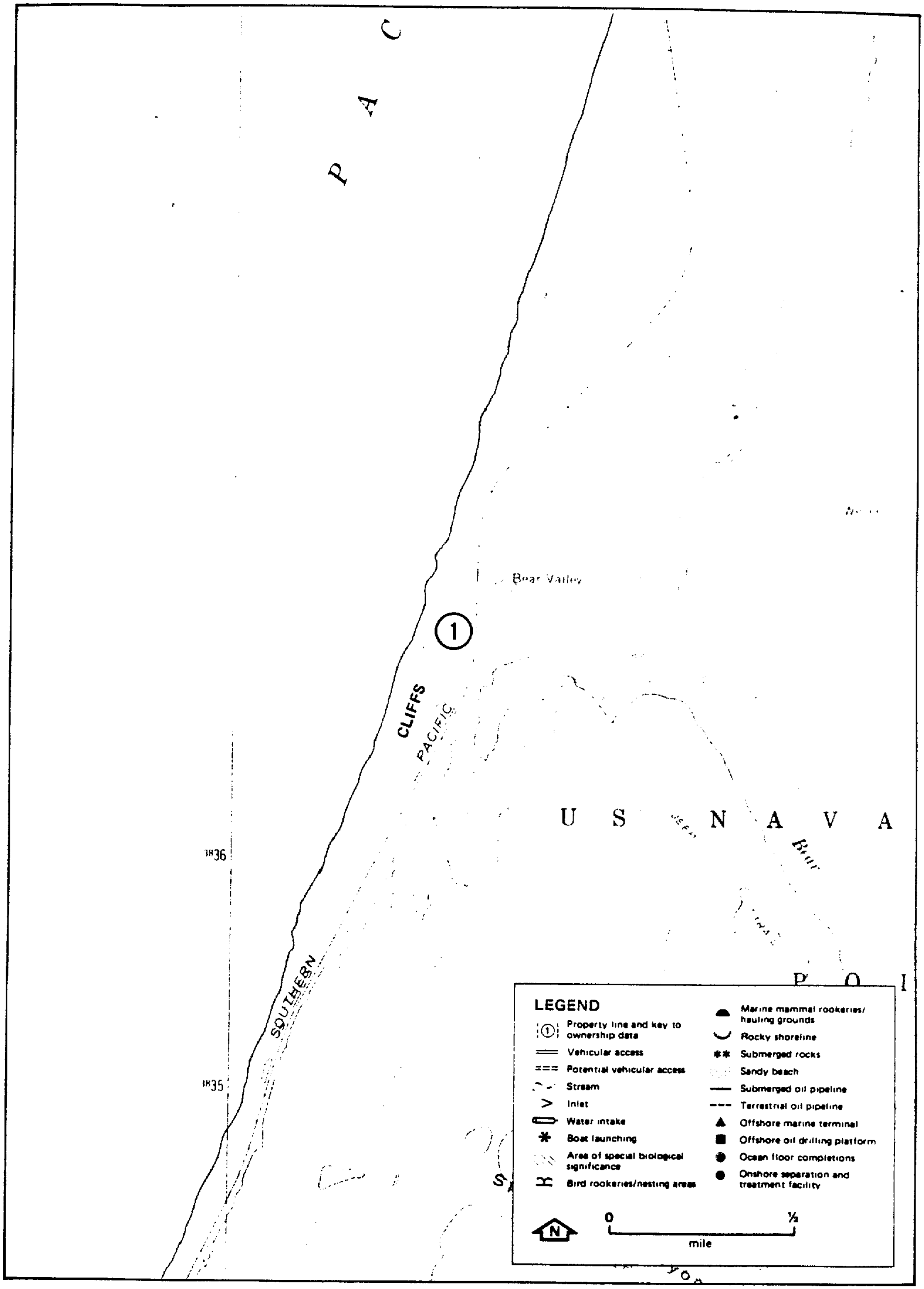


Figure 700-38. SPRING CANYON

Table 700-39. POINT PEDERNALES

Shoreline Characteristics

General Description: narrow short sandy beaches broken by rocky marine terraces
Backshore: steep bluffs and cliffs
Trafficability: unknown

Cleanup Technique Code: (4)

Access

Principal Entry Points: Coast road from Surf on north or Jalama. Access control by gates on military reservation
Boat Launching Facilities: None   Nearest: Surf

Inlets/Streams

Inlets: None
Streams: several intermittent creeks

Ownership and Control

Principal Property Owner(s):

Address:	(1)	(2)
	Vandenburg Air Force Base	Coast Guard Station
	Vandenburg, California	Point Arguel
Phone:	(805) 866-1611	(805) 962-7430 (CG group SB)

Controlling Government Authority: Department of Defense
Waterfront Usage: leased to cattle ranchers (natural)

Biological Data

Potential Threat to Wildlife:
Special Biological Significance: CC designates coastal area as part of a special marine environment.

Seasonal Factors

Sandy beaches may migrate on- and offshore seasonally.

Special Factors Affecting Spill Control

Rocky areas are high energy environments and should rapidly clean naturally.

Comments

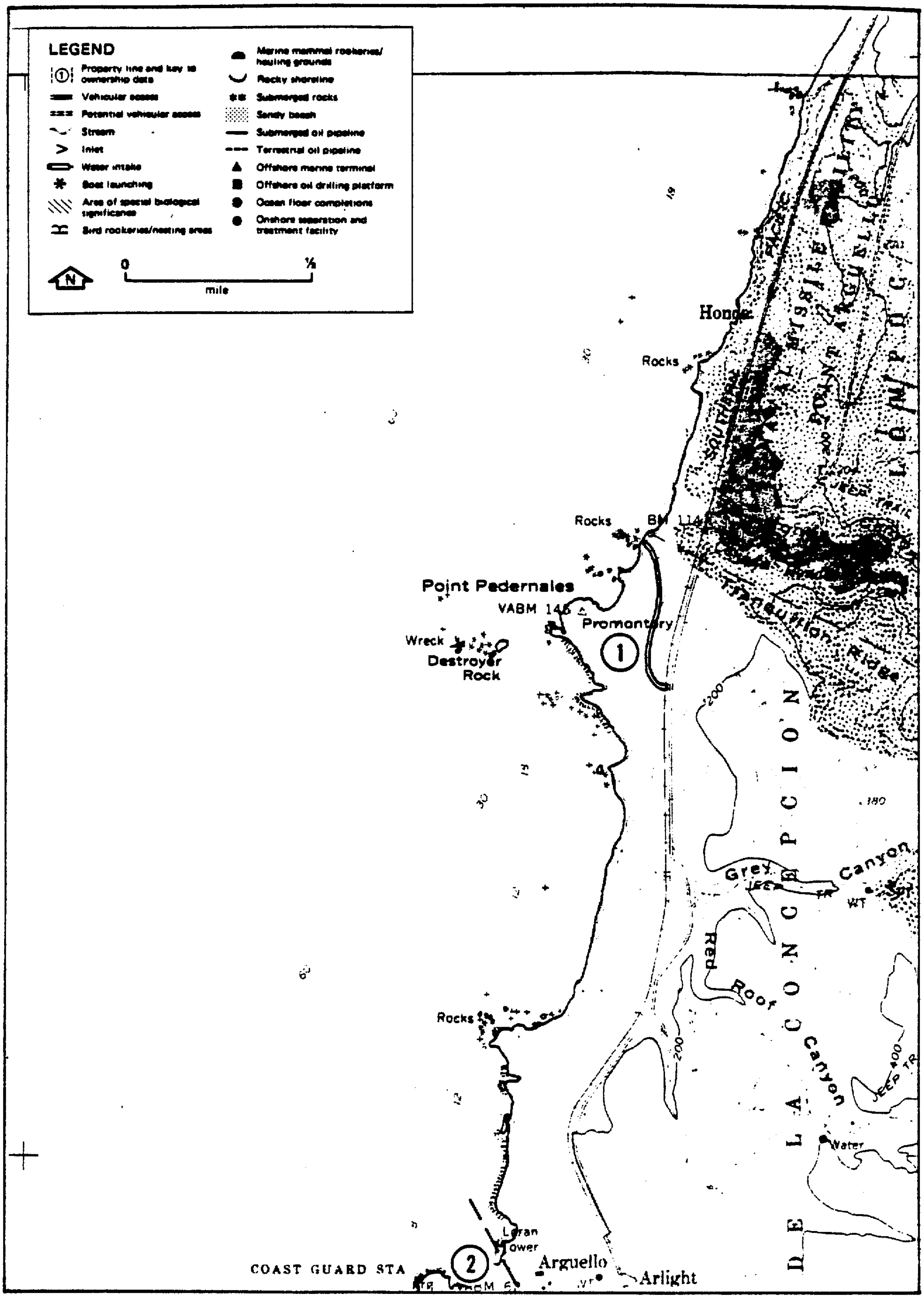


Figure 700-39. POINT PEDERNALES

Table 700-40. POINT ARGUELLO

Shoreline Characteristics

General Description: rocky, marine terraces, with occasional pocket beaches
Backshore: steep slopes
Trafficability: not applicable

Cleanup Technique Code: (4)

Access

Principal Entry Points: No direct access to shoreline
Boat Launching Facilities: None   Nearest: Surf

Inlets/Streams

Inlets: None
Streams: intermittent high gradient stream

Ownership and Control

Principal Property Owner(s):

	(1)	(2)
Address:	Vandenberg Air Force Base Vandenberg, California	Coast Guard Station
Phone:	(805) 866-1611	(805) 962-7430 (CG group SB)

Controlling Government Authority: Department of Defense
Waterfront Usage: Natural

Biological Data

Potential Threat to Wildlife:
Special Biological Significance: CC designates coastal area as part of a special marine environment.

Seasonal Factors

Special Factors Affecting Spill Control

High energy environment; probably high rate of natural cleaning. Oil deposited in coves may be more persistent.

Comments

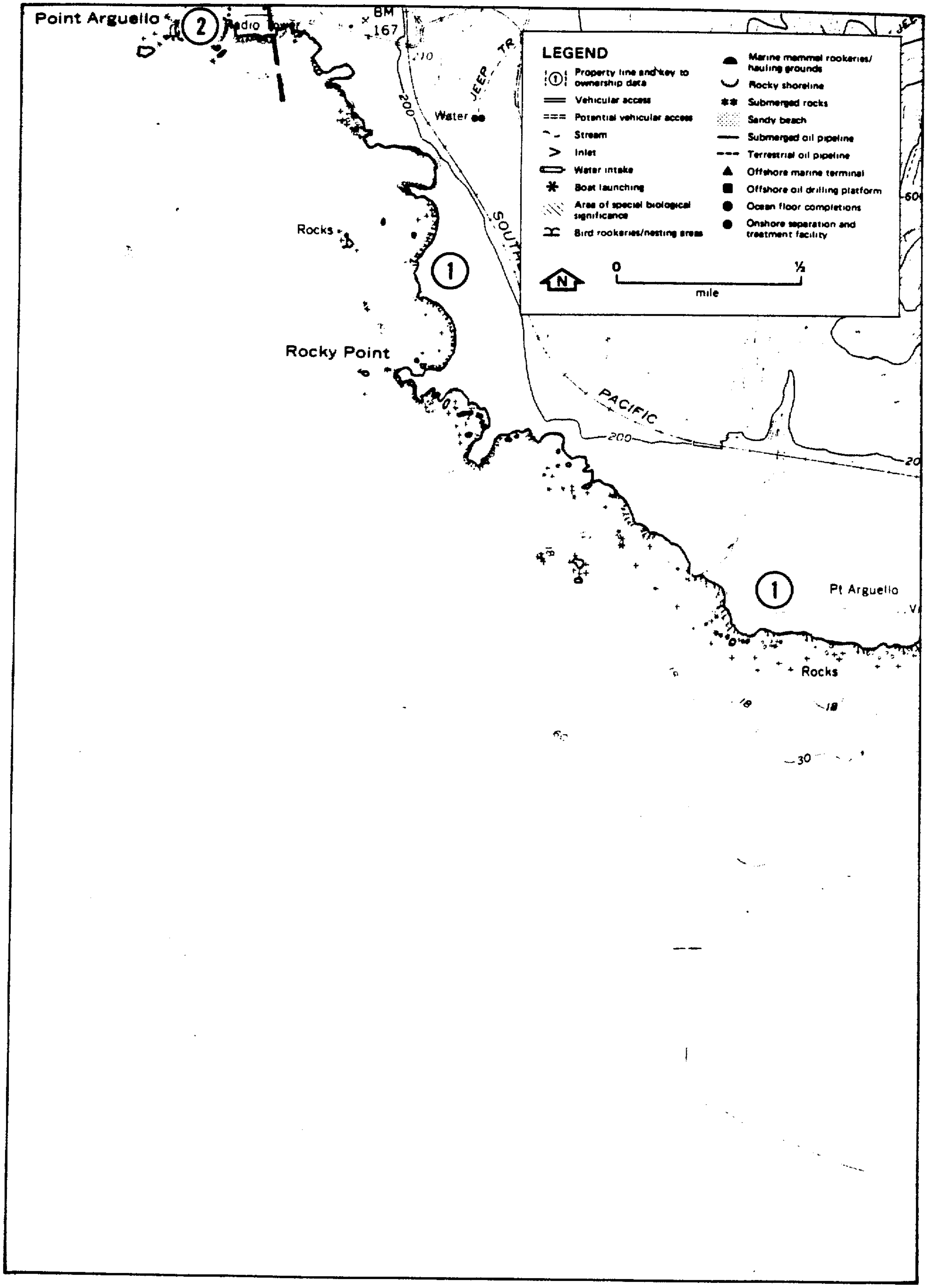


Figure 700-40. POINT ARGUELLO

Table 700-41. SUDDEN FLATS

Shoreline Characteristics

General Description: marine terraces, some sandy beaches
Backshore: cliffs
Trafficability: unknown

Cleanup Technique Code: (4)

Access

Principal Entry Points: No access to beach. Boat landing available at old Coast Guard station
Boat Launching Facilities: None Nearest: Surf

Inlets/Streams

Inlets: None
Streams: Agua Viva Creek & several high gradient intermittent creeks

Ownership and Control

Principal Property Owner(s):

Address: (1)
Vandenberg Air Force Base
Vandenberg, California
Phone: (805) 866-1611
Controlling Government Authority: Department of Defense
Waterfront Usage: Natural

Biological Data

Potential Threat to Wildlife:
Special Biological Significance: CC designates coastal area as part of a special marine environment.

Seasonal Factors

Sandy beach may migrate on- and offshore seasonally.

Special Factors Affecting Spill Control

High energy environment should self-clean rapidly.

Comments

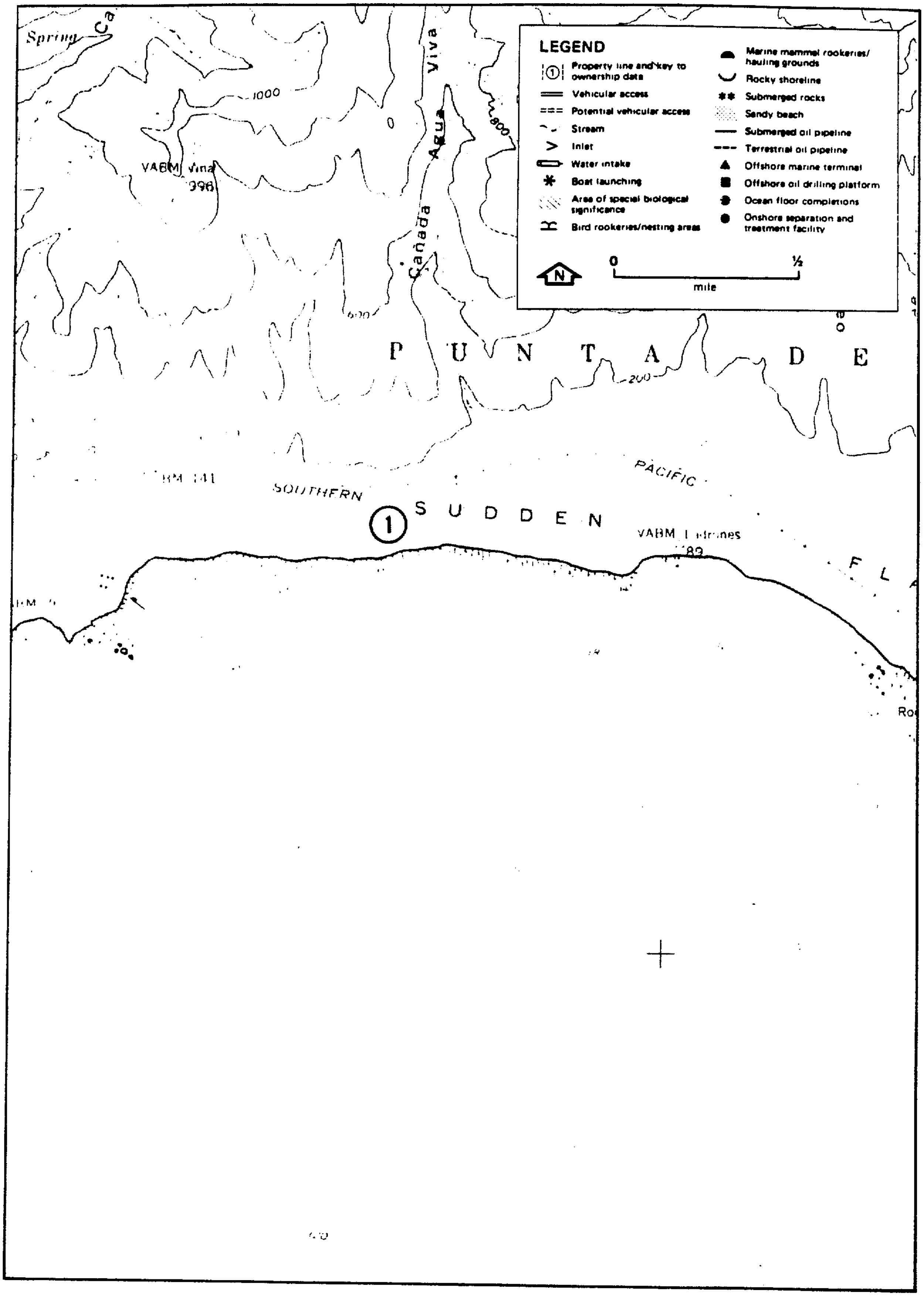


Figure 700-41. SUDDEN FLATS

Table 700-42. SUDDEN CANYON

Shoreline Characteristics

General Description: narrow, steep, sandy beaches, some rocky areas and marine terraces
Backshore: steep bluffs
Trafficability: unknown

Cleanup Technique Code: (4)

Access

Principal Entry Points: potential access southeast of Sudden
Boat Launching Facilities: None   Nearest: Surf

Inlets/Streams

Inlets: None
Streams: several intermittent high gradient creeks

Ownership and Control

Principal Property Owner(s):

Address: (1)
Vandenberg Air Force Base
Vandenberg, California
Phone: (805) 866-1611
Controlling Government Authority: Department of Defense
Waterfront Usage: Natural

Biological Data

Potential Threat to Wildlife:
Special Biological Significance: CC designates the coastal area as part of a special marine environment.

Seasonal Factors

Sandy beaches may migrate on- and offshore seasonally.

Special Factors Affecting Spill Control

High energy environment should self-clean rapidly.

Comments

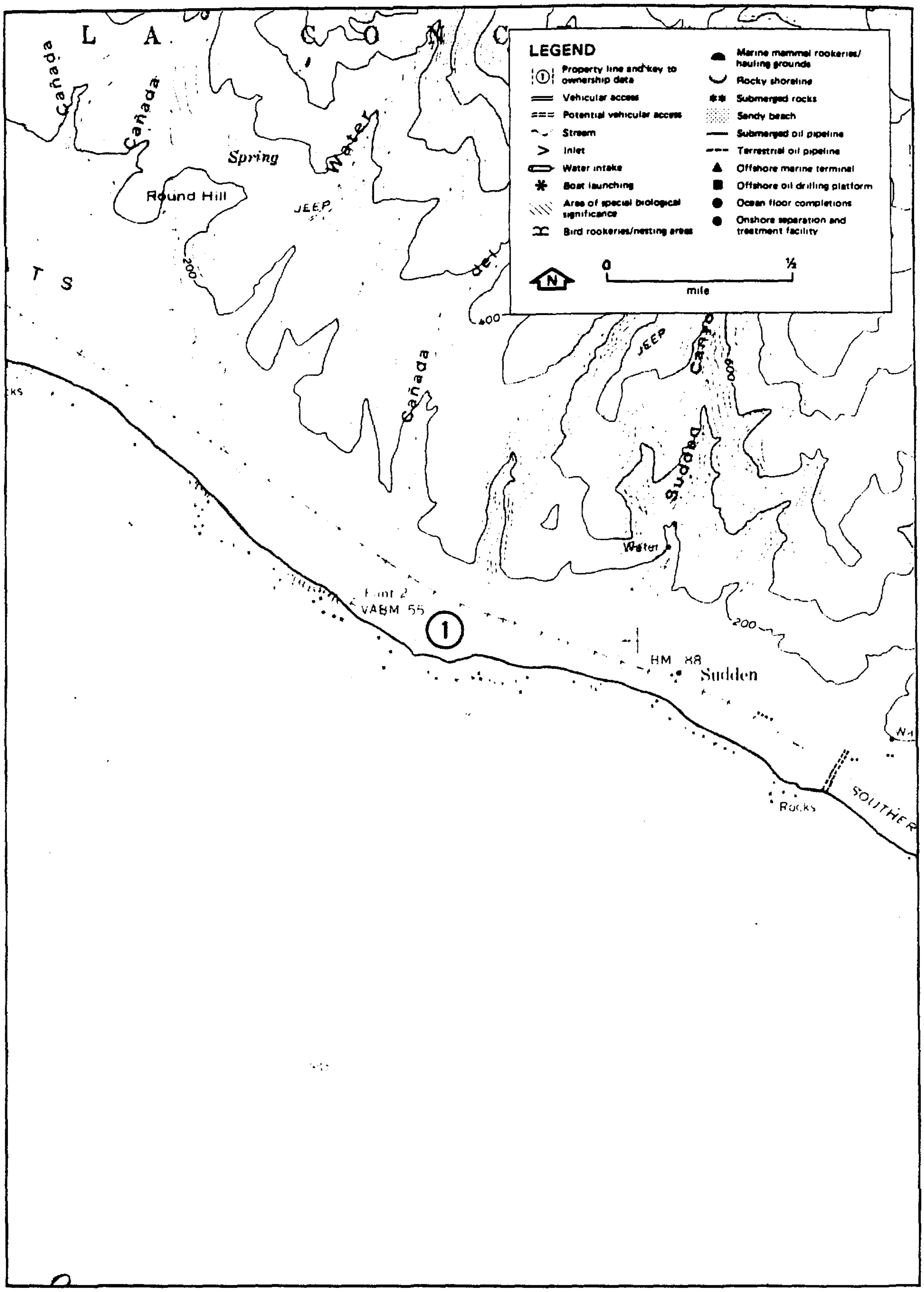


Figure 700-42. SUDDEN CANYON

Table 700-43. JALAMA

Shoreline Characteristics

General Description: combination of rocky cliffs and small, narrow, steep, sandy beaches in north becoming broader and more sandy in the south
Backshore: steep bluffs
Trafficability: good on intertidal areas

Cleanup Technique Code: (4 - northern half, 3 - beach area); temporary disposal site at beach parking area

Access

Principal Entry Points: Jalama Beach Road from the east of coast road from the south; stream crossing at Jalama Park may be impassable
Boat Launching Facilities: None Nearest: Gaviota

Inlets/Streams

Inlets: None
Streams: Jalama Creek (anadromous fish stream) and several other high gradient creeks

Ownership and Control

Principal Property Owner(s):
Address:

(1)	(2)	(3)
Vandenberg Air Force Base Vandenberg, California	County of Santa Barbara Park Dept Jalama Beach, California	Point Conception Co. 523 W. 5th Street Los Angeles, CA

Phone:

(805) 866-1611	(805) 736-0222	Unlisted

Controlling Government Authority: Dept. of Defense & Parks and Recreation
Waterfront Usage: Natural and recreational

Biological Data

Potential Threat to Wildlife: anadromous fish
Special Biological Significance: Coastal area is designated as a special marine habitat.

Seasonal Factors

Jalama Creek inlet commonly barred; inlet could open at certain times of year. Sandy beaches may migrate on- and offshore seasonally.

Special Factors Affecting Spill Control

Jalama Creek inlet would have to be closed off if sand is eroded.

Comments

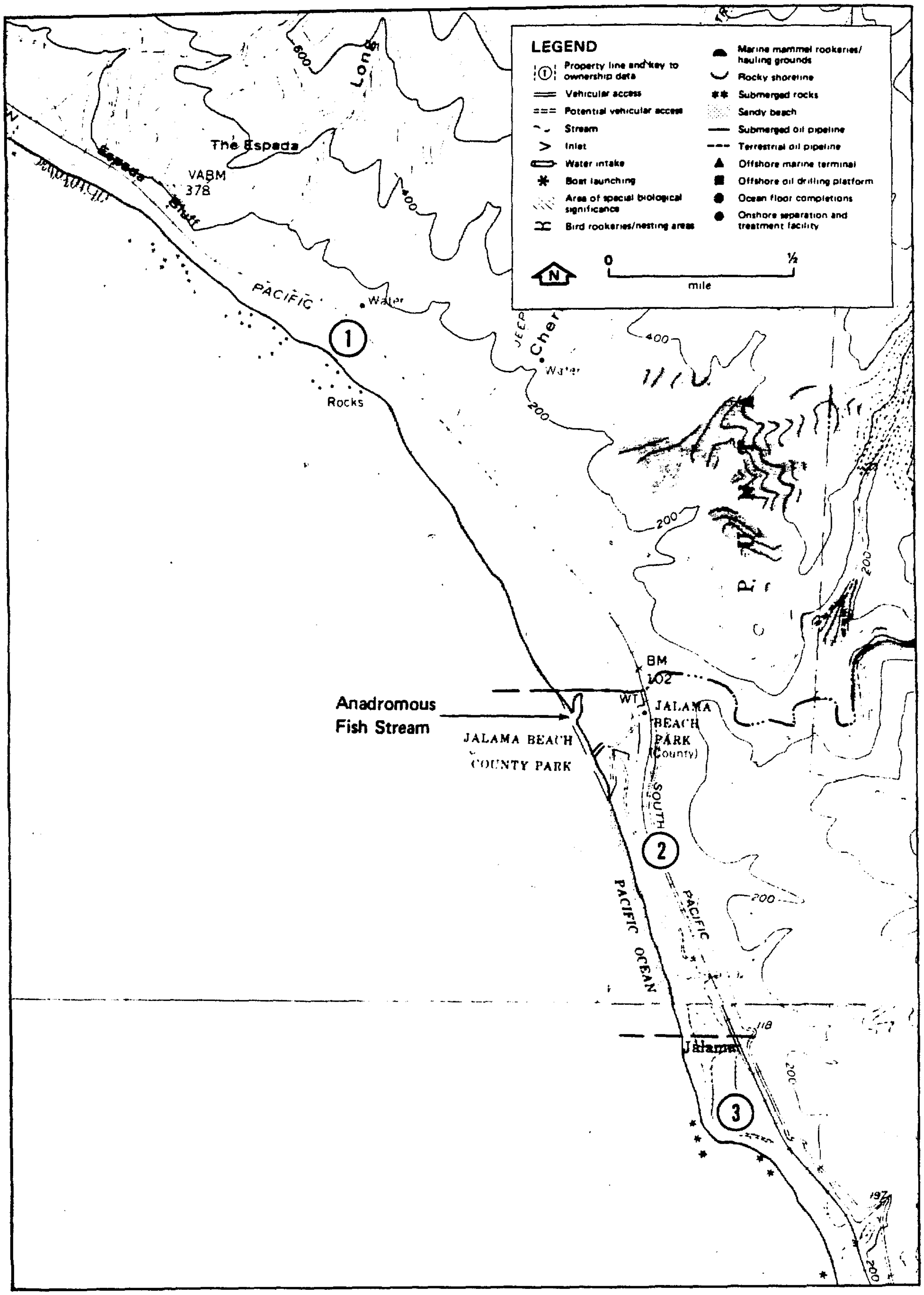


Figure 700-43. JALAMA

Table 700-44. POINT CONCEPTION

Shoreline Characteristics

General Description: narrow, steep, sandy beaches with many submerged rocks toward the north
Backshore: steep bluffs, many cliffs
Trafficability: Unknown

Cleanup Technique Code: (4)

Access

Principal Entry Points: Jalama Beach Park Road to the north; Coast Guard station at Point Conception in the south
Boat Launching Facilities: None Nearest: Gaviota

Inlets/Streams

Inlets: None
Streams: several high gradient intermittent streams

Ownership and Control

Principal Property Owner(s):

Address:	(1)	(2)	(3)
	Point Conception Co.	Standard Oil Co.	USCG Reservation
	523 W. 5th Street	1 Dominion Road	Point Conception
	Los Angeles, CA	Santa Maria, CA	CA
Phone:	not listed/unknown	(805) WE7-6333	(805) 962-7430

Controlling Government Authority:
Waterfront Usage: natural

Biological Data

Potential Threat to Wildlife:
Special Biological Significance: Kelp beds off the east coast of Point Conception provide good fishing for Santa Barbara's commercial fleet. Point Conception is the boundary between southern and central faunal zones; the boundary fauna is of particular interest and should be preserved (Siva, 1976).

Seasonal Factors

Special Factors Affecting Spill Control

Very high energy environment, self-cleaning should be rapid.

Comments

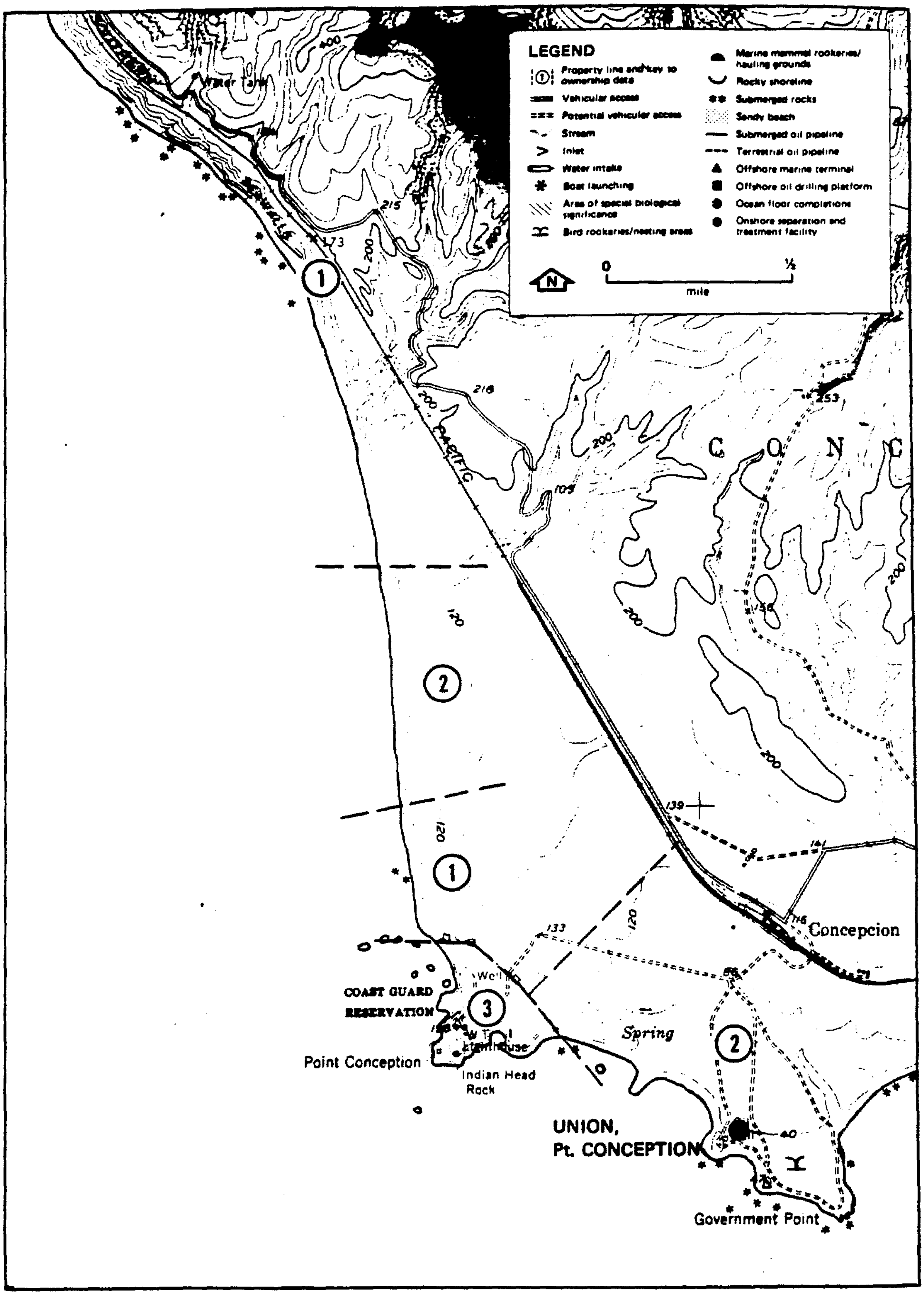


Figure 700-44. POINT CONCEPTION

Table 700-85. SAN MIGUEL ISLAND

Shoreline Characteristics

General Description: Predominantly steep, cliffs with occasional sand/gravel pocket beaches and rocky shoreline sections.

Backshore: A few large, flat, sandy beaches are located at the Western tip of the island, Simonton Cove, Cuyler Harbor, and Cardwell Pt.

Trafficability: Good on sandy beaches

Cleanup Technique Code (3)

Access

Principal Entry Points: Potential access by boat at Southern side of Pt. Bennett in fair weather and at Cuyler Harbor

dangerous.

Inlets/Streams

Inlets: None

Streams: Intermittent creeks

Ownership and Control Principal Property Owner(s): U.S. Government

Address:

Phone:

Controlling Government Authority: U.S. Navy

Waterfront Usage: Natural

Biological Data

Potential Threat to Wildlife: Marine Mammals and birds

Special Biological Significance: This island provides rookeries for five pinniped species and a haul-out area for a sixth. The west end is particularly important (Siva, 1976). The waters surrounding the island are of special biological significance, and the Coastal Commission recommends that offshore and onshore habitats be preserved in their present, relatively undisturbed, condition. The Santa Barbara Channel waters and islands are regarded by the Coastal Commission as a fragile resource area. Numerous points and reefs provide excellent habitats for aquatic species, and consequently a prime resource for fishermen. There are major fishing areas on Ventura Flats, immediately west of Goleta, and around the islands. San Miguel Island is presently inhabited by three rare and endangered species. The endangered species is the California Brown Pelican and the rare species are the Guadalupe Fur Seal and the Island Fox.

Seasonal Factors

Sand beaches can be expected to migrate on- and offshore seasonally.

Special Factors Affecting Spill Control

The convergence of ocean and channel currents at the easternmost tip of the island results in breakers and rough seas, making access or approach extremely dangerous.

Comments

Pinnipeds are very sensitive to human disturbance thus no onshore cleanup should be attempted near haul-out or rookery areas.

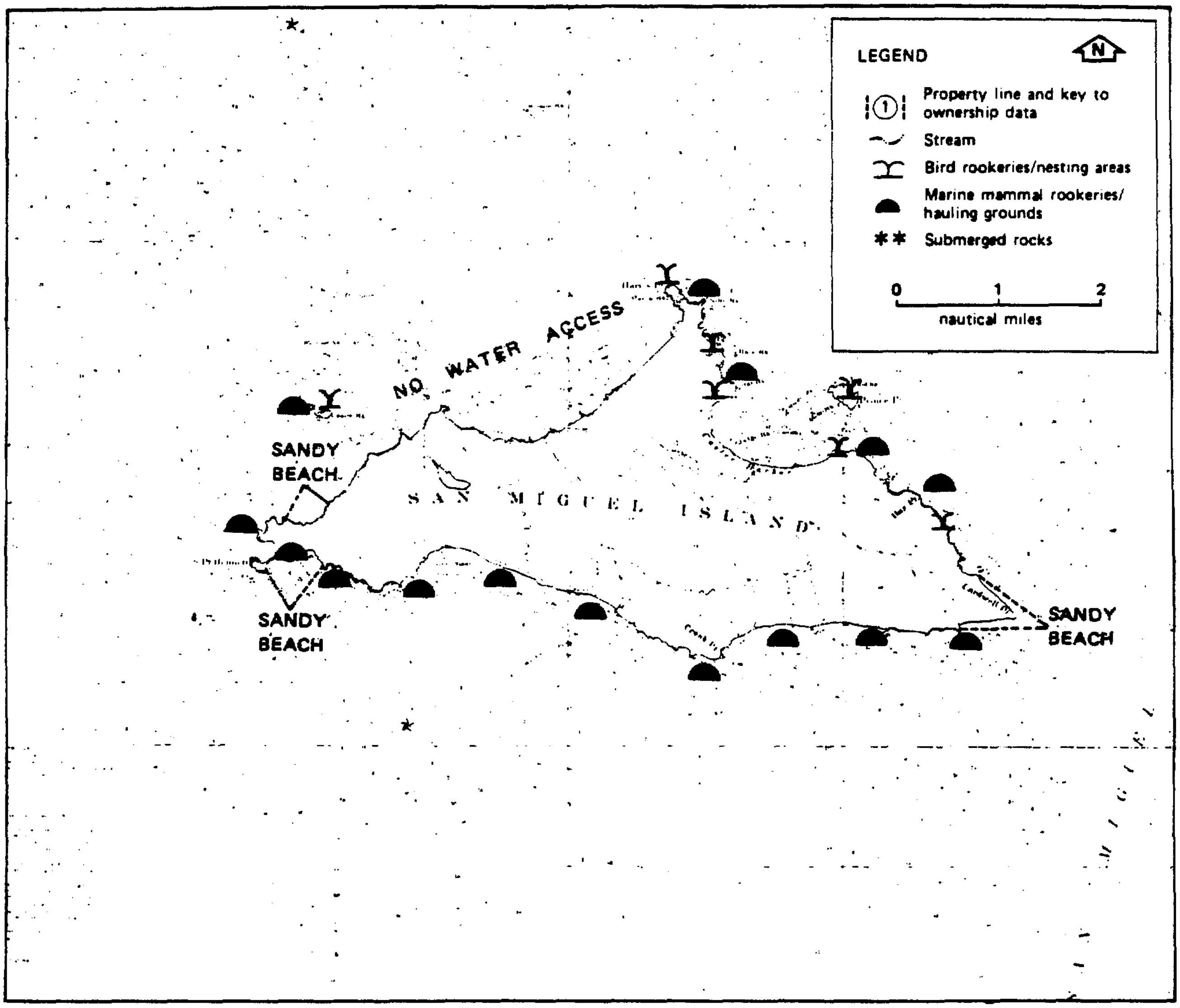


Figure 700-85. SAN MIGUEL ISLAND

Table 700-86. SANTA ROSA ISLAND

Shoreline Characteristics

General Description: Predominantly steep or vertical cliffs falling directly into the water with occasional pocket sand/gravel beaches and/or rocky shoreline

Backshore:

Trafficability:

Cleanup Technique Code (3)

Access

Principal Entry Points: Landing is possible at most pocket beaches during fair weather

Boat Launching Facilities: Unknown

Inlets/Streams

Inlets: None

Streams: Numerous steep intermittent creeks

Ownership and Control

Principal Property Owner(s):

Address:

A. Vail
123 W. Padre St.
Santa Barbara, CA 93105

Phone:

Controlling Government Authority: Federal Government

Waterfront Usage: Sheep and cattle grazing on bluffs

Biological Data

Potential Threat to Wildlife: Birds and marine mammals

Special Biological Significance: Santa Rosa Island supports pinniped rookeries (Siva, 1976), and the waters surrounding it have been designated an area of special biological significance. Santa Rosa Island is inhabited by an endangered species, the California Brown Pelican and a rare species, the Island Fox. The island is also a hauling ground for Northern Elephant Seals, Harbor Seals, and California Sea Lions (Mate, 1977).

Seasonal Factors

Special Factors Affecting Spill Control

Extensive kelp beds off the northwestern tip of the Island can restrict access to adjacent shoreline.

Comments

Pinnipeds are very sensitive to human disturbance thus onshore cleanup should not be attempted near haul-out or rookery areas.

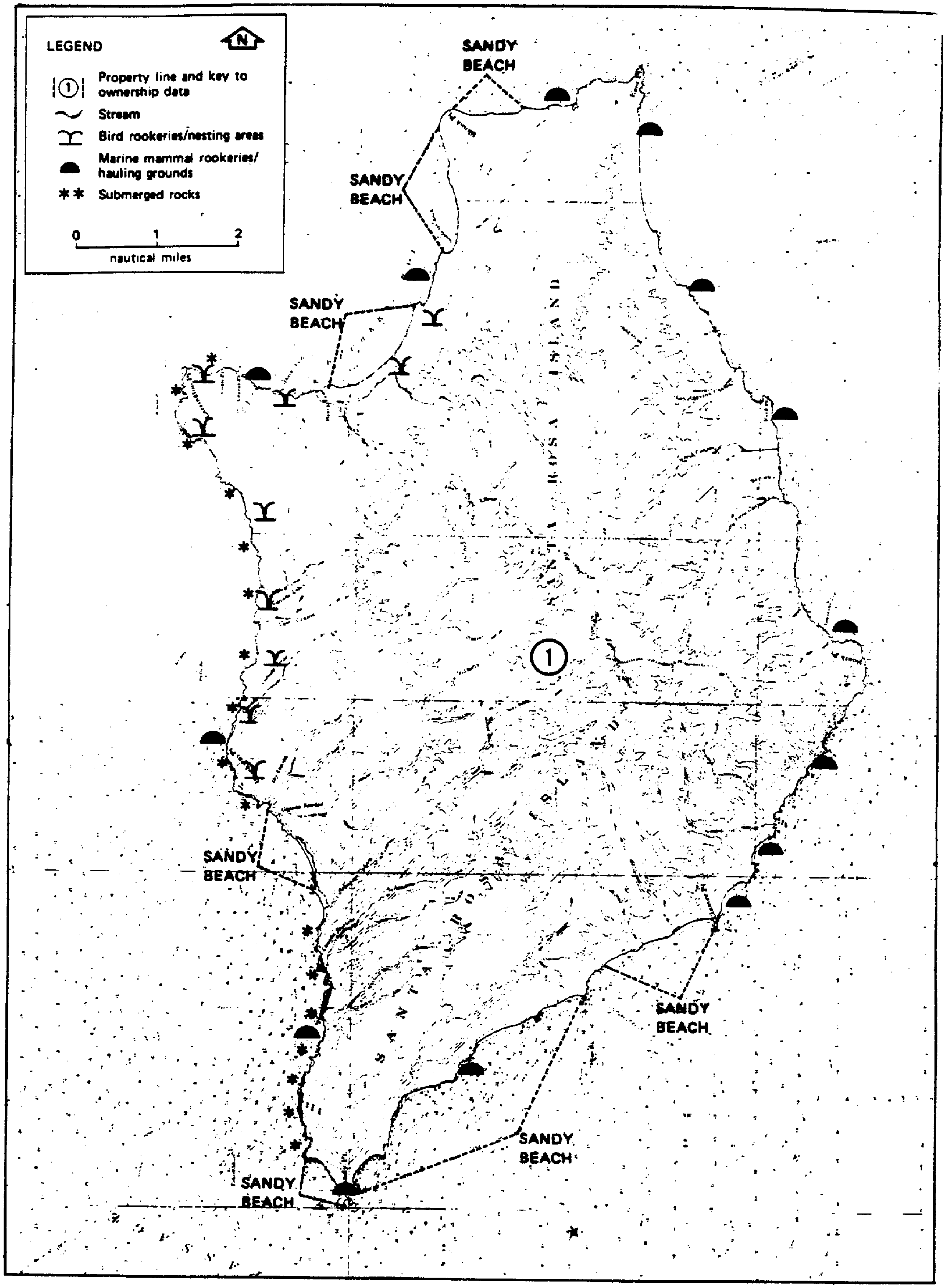


Figure 700-86. SANTA ROSA ISLAND

Table 700-87. SANTA CRUZ ISLAND

Shoreline Characteristics

General Description: Predominantly steep or vertical cliffs falling directly into the water with occasional pocket sand/gravel beaches and rocky shoreline in the sheltered areas

Backshore:

Trafficability:

Cleanup Technique Code (3)

Access

Principal Entry Points: Access by boat at landings located at Scorpion Anchorage, Prisoner's Harbor and Willows Anchorage. There is also a roadway ending at Scorpion Anchorage.

Boat Launching Facilities: Scorpion and Willows anchorages and Prisoner's Harbor

Inlets/Streams

Inlets: None

Streams: Intermittent creeks

Ownership and Control

Principal Property Owner(s):

Address:	(1)	(2)
	Pier Gherini	Santa Cruz Island Company
	230 La Arcada Blvd.	Suite 1400
	Santa Barbara, CA 93104	615 S. Flower St.
		Los Angeles, CA 90017

Phone:

Controlling Government Authority: U.S. Government

Waterfront Usage: Cattle and sheep grazing on bluffs; natural

Biological Data

Potential Threat to Wildlife: Birds and marine mammals

Special Biological Significance: Santa Cruz Island supports seal and sea lion rookeries. The fauna of the intertidal zone is relatively undisturbed, and is biologically significant because the west end of the island intercepts the lower edge of the Santa Barbara Channel eddy (Siva, 1976). The waters surrounding the island have been designated an area of special biological significance. Santa Cruz Island supports habitats for three rare and endangered species. The endangered species is the California Brown Pelican and the rare species are the Guadalupe Fur Seal and the Island Fox. The island also supports rookeries and hauling grounds for Northern Elephant Seals, Harbor Seals, and California Sea Lions (Mate, 1977).

Seasonal Factors

Sand and gravel in pocket beaches will move on- and offshore seasonally.

Special Factors Affecting Spill Control

Currents off Fraser Point can be extremely dangerous.

Comments

Pinnipeds are very sensitive to human disturbance thus onshore cleanup should not be attempted near haul-out or rookery areas.

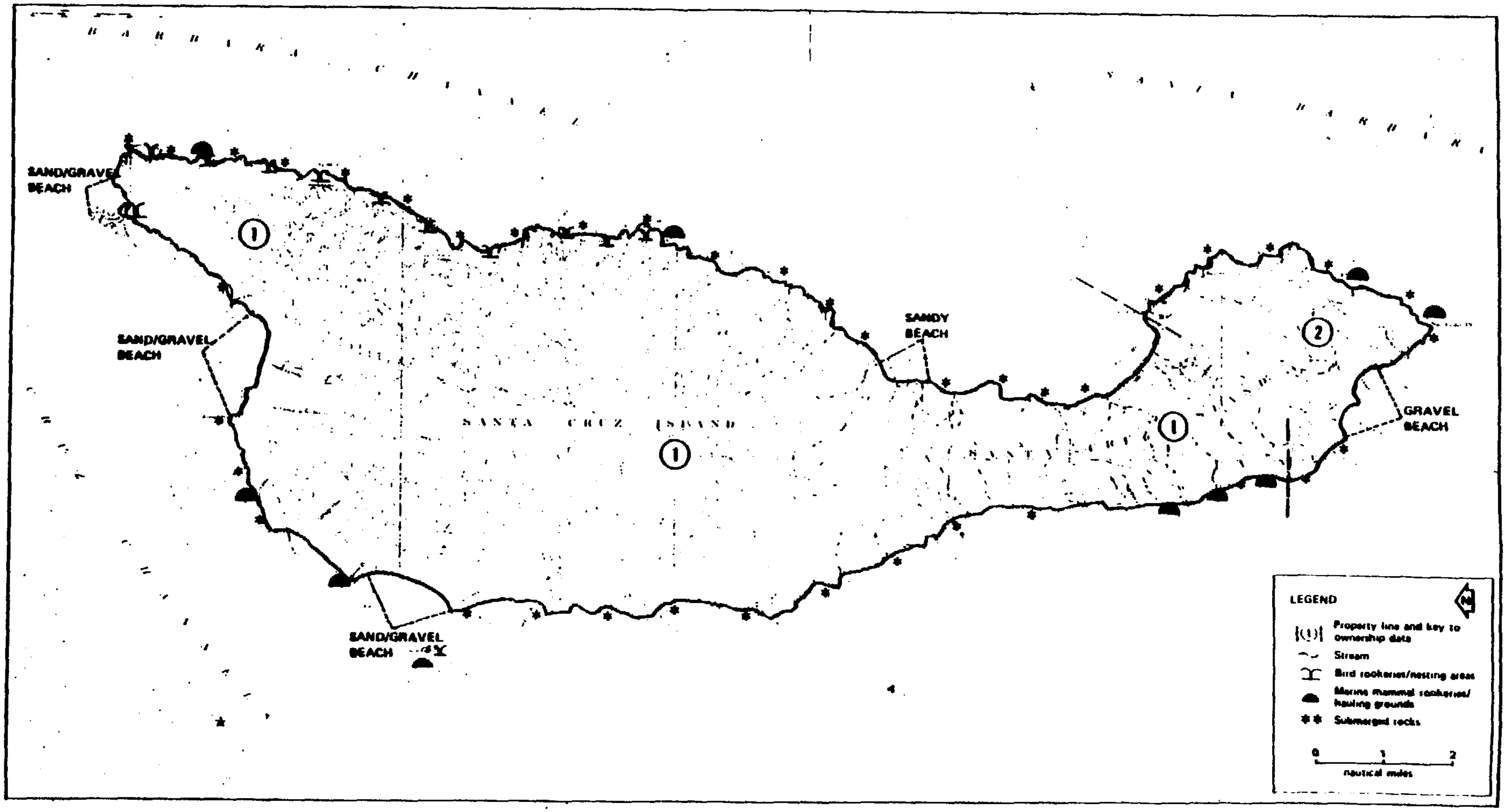


Figure 700-87. SANTA CRUZ ISLAND

Table 700-88. ANACAPA

Shoreline Characteristics
General Description: Almost entirely vertical cliffs, terraces, and rocky shoreline with a few gravel pocket beaches
Backshore:
Trafficability:

Cleanup Technique Code (3)

Access
Principal Entry Points: Access by boat is possible at the Coast Guard landing on the north side near the eastern extremity. Other landings can be made on either side of the island near the west opening and at East Fish Camp.

Boat Launching Facilities: Coast Guard Landing

Inlets/Streams
Inlets: None
Streams: None

Ownership and Control
Principal Property Owner(s):

Address:
Channel Islands National Monument
1699 Anchors Way
Ventura, CA 93003
Phone:
Controlling Government Authority: U.S. National Park Service
Waterfront Usage: Limited recreation, diving, camping; mostly natural.

Biological Data
Potential threat to Wildlife: Birds, marine mammals, and intertidal communities
Special Biological Significance: The waters around the island are designated an area of special biological significance. Anacapa Island is inhabited by the California Brown Pelican which is listed as an endangered species. The island also supports rookeries and hauling grounds for Northern Elephant Seals, Harbor Seals and California Sea Lions (Mate, 1977). In addition, Anacapa supports the richest tide pools in southern California.

Seasonal Factors

Special Factors Affecting Spill Control
Any disturbance of bird rookeries should be avoided. Helicopter landing is possible above Fish Camp and atop Middle and Eastern Islands.

Comments
Pinnipeds are very sensitive to human disturbance thus onshore cleanup should not be attempted near haul-out or rookery areas.

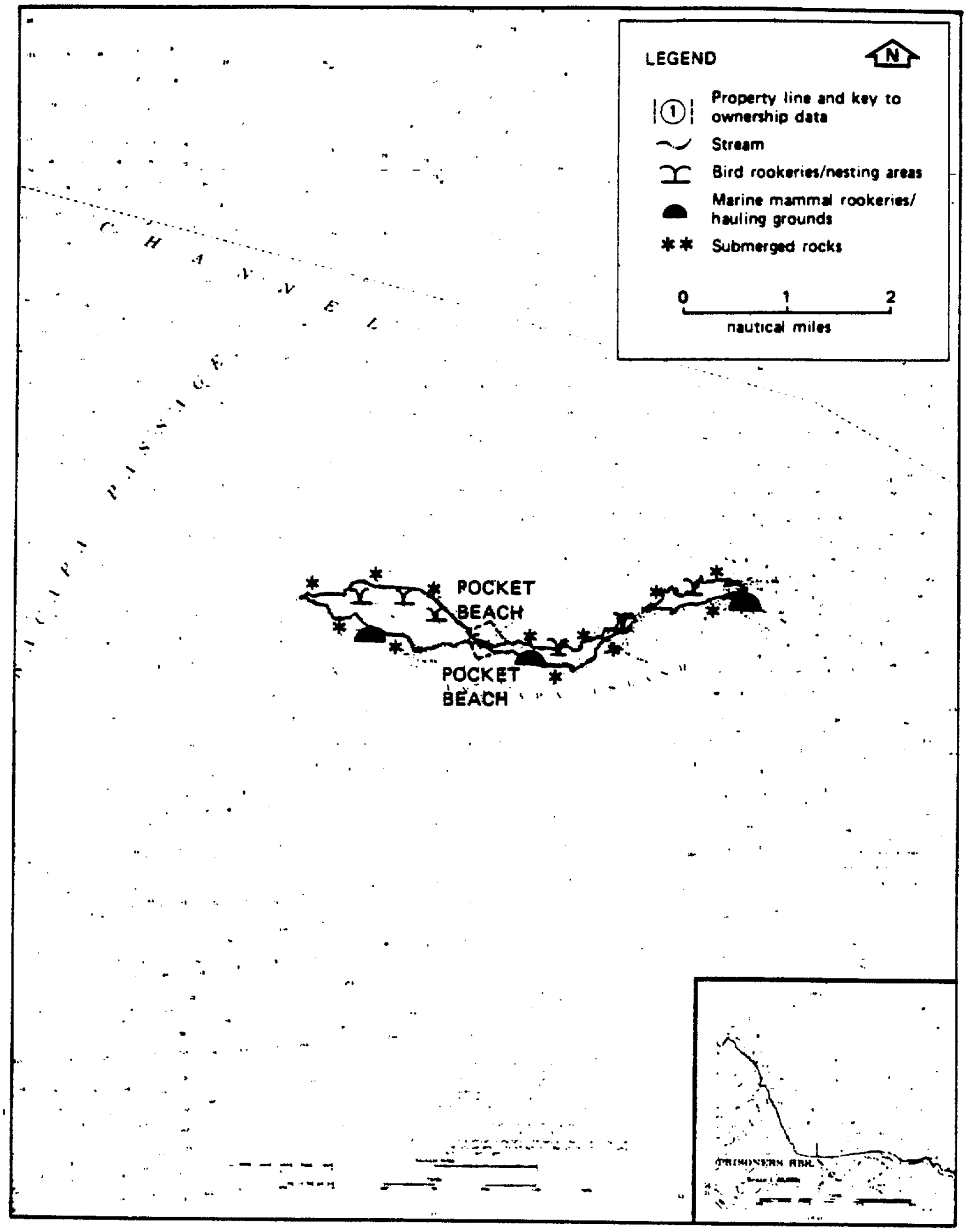


Figure 700-88. ANACAPA ISLAND

6. SITE-SPECIFIC DESCRIPTION

SITE-SPECIFIC DESCRIPTION OF COASTAL RESOURCES WITHIN CLEAN SEAS SEGMENTS ADJACENT TO THE SANTA MARIA BASIN AND SANTA BARBARA CHANNEL OCS AREAS (Woodward-Clyde, 1980; U.S. Fish and Wildlife Service, 1981)

CLEAN SEAS SEGMENT*	DESCRIPTION
24 Deer Canyon	Habitats: This segment is composed of rocky shorelines and rocky marine terraces at the base of cliffs. Living Resources: This area contains several shorebird and seabird nesting areas.
25 Point San Luis	Habitats: Rocky shores extend from the the northern extremity of this segment southeast to Point San Luis. Along the west shore of San Luis Obispo Bay, the shoreline is composed of narrow sandy beaches. Living Resources: Shorebirds and seabirds also nest on Point San Luis. Significant beds of bull kelp are located immediately west of Point San Luis. Other Uses: The waterfront in the vicinity of Point San Luis is used for a variety of recreation uses, including sportfishing, sunbathing, sailing, etc.

CLEAN SEAS SEGMENT	DESCRIPTION
26 Avila Beach	Habitats: Sandy beaches are found in the western-most half-mile of this segment, in Avila State Beach (immediately northwest of Fossil Point) and at Mallagh Landing [0.5 km (0.3 miles) from the eastern edge of the segment]. Rocky shores are dispersed between the sandy beaches. Living Resources: Seals haul-out at Mallagh Landing and shorebirds and seabirds nest in the area.
27 Shell Beach	Habitats: The shoreline extending southeastward 1.4 km (0.9 miles) from the western edge of the segment and northwestward 2.3 km (1.4 miles) from the eastern edge of the segment mostly is comprised of rocky shorelines and marine terraces with small pocket beaches. Sandy beaches are found between the peripheral rocky beaches. Living Resources: Shorebirds and seabirds nest in the area.
28 Pismo Beach	Habitats: Rocky shores and marine terraces extend 1.1 km (0.7 miles) south from the northwestern edge of this segment. The remaining shoreline is comprised of sandy beaches. Living Resources: Pismo Creek, which empties into the Pacific Ocean through Pismo State Beach, has been identified as an anadromous fish stream. Meadow Creek wetland, which is located inland, is considered to be a biologically significant area. Shorebirds overwinter and migrate through the area and wading birds inhabit the wetlands. Pismo clams are found along this coastline. Other Uses: Pismo State Beach, located in the southern portion of the segment, contains recreational amenities including a boat launching site. Pismo Invertebrate Reserve is located immediately north of Pismo Beach.

CLEAN SEAS SEGMENT	DESCRIPTION
29 Oceano	Habitats: This segment is composed of wide sandy beaches. Living Resources: Arroyo Grande Creek, which empties into the Pacific Ocean 1.3 km (0.8 miles) south of the northern edge of this segment, has been identified as an anadromous fish stream. Oceano Lagoon, which extends northward from the mouth of Arroyo Grande Creek to the edge of the segment, is considered to be a biologically significant area. Pismo clams are common on the coast. Other Uses: Pismo State Beach extends along the entire length of this segment.
30 Oso Flaco Lake	Habitats: Wide sandy beaches line this segment. Living Resources: Oso Flaco Lake and wetlands are productive inland areas. Pismo clams are common on the coast. Other Uses: Pismo State Beach encompasses the northern 3.6 km (2.2 miles) of this segment. Pismo Clam Preserve is located on the southern portion of the segment.
31 Guadalupe	Habitats: The coastline of this segment is comprised of sandy beaches. Living Resources: The Santa Maria River wetlands area, located 0.8 km (0.5 miles) north of the southern edge of the segment serves as a bird feeding, resting, and nesting area and is considered to be a biologically significant area. Pismo clams are common on the coast. Other Uses: The beaches along this segment are used for recreation.
32 Mussel Point	Habitats: The shore is predominantly sandy, with some rocks at Mussel Point, located 1.6 km (1 mile) north of the southern edge of this segment.

CLEAN SEAS SEGMENT	DESCRIPTION
33 Point Sal	Habitats: Sandy beaches extend 1 km (.6 miles) southward from the northern edge of this segment. Sandy beaches are also found in two 0.9 km (0.6 mile) sections south of Point Sal State Park. The remainder of the coastline is comprised of rocky shoreline and rocky marine terraces. Living Resources: California sea lions and harbor seals haul-out at Point Sal. Other Uses: Point Sal Beach State Park is located approximately 1.62 km (1 mile) east of Point Sal.
34 Lions Head	Habitats: Rocky shorelines and rocky marine terraces make up the northern 3 km (1.9 miles) of this segment; the remaining shoreline is composed of sandy beaches. Living Resources: Sandy beaches are probably surf clam habitats. Other Uses: The coastline within this segment is part of Vandenberg Air Force Base.
35 Vandenberg	Habitats: The coastline is composed of sandy beaches. Living Resources: The sand dunes north of San Antonio Creek have been identified as bird rookeries/nesting areas. Other Uses: The coastline is within Vandenberg Air Force Base.
36 Purisima Point	Habitats: The shoreline in this segment is mostly rocky with rocky marine terraces. Living Resources: Nesting area for California least tern. Other Uses: Coastline is within Vandenberg Air Force Base.

CLEAN SEAS SEGMENT	DESCRIPTION
37 Lompoc Landing	Habitats: The shoreline is mostly rocky to the north, giving way to low, flat sandy beaches with tidal ponds at the mouth of the Santa Ynez River. Living Resources: Numerous birds use the Santa Ynez River wetlands [located 1.62 km (1 mile) north of the southern edge of this segment] as rookeries/nesting/overwintering areas; these wetlands, along with the Santa Ynez estuary and coastal area, are considered to be biologically significant areas. Other Uses: Coastline is within Vandenberg Air Force Base.
38 Spring Canyon	Habitats: The shoreline is composed of low, flat, sandy beaches. Other Uses: Coastline is within Vandenberg Air Force Base.
39 Point Pedernales	Habitats: Rocky marine terraces extend 4.0 km (2.5 miles) northward from Point Arguello and 0.8 km (0.5 miles) southward from Point Pedernales. The remainder of the shoreline is composed of narrow sandy beaches with submerged rocks close to shore. Living Resources: Seabirds nest in the area. Other Uses: Vandenberg Air Force Base owns the entire coast except for a 0.4 km (0.25 mile) section along the southern edge of the segment which is owned by the U.S. Coast Guard.
40 Point Arguello	Habitats: The shoreline in this segment is comprised mostly of rocky marine terraces with occasional rocky beaches. Living Resources: Seabirds and shorebirds nest in the area.

CLEAN SEAS SEGMENT	DESCRIPTION
40 Point Arguello (cont.)	Other Uses: The northern 0.4 km (0.25 mile) of this segment is used as a U.S. Coast Guard Station and the remainder of the shoreline and inland area is part of Vandenberg Air Force Base.
41 Sudden Flats	Habitats: About 3.2 km (2 miles) of this segment is composed of rocky marine terraces. The eastern-most mile of shoreline is composed of sandy beaches. Other Uses: The shoreline is within the boundary of Vandenberg Air Force Base.
42 Sudden Canyon	Habitats: The shoreline is comprised of narrow, steep, sandy beaches. Rocky areas and rocky marine terraces are interspersed throughout the segment. Other Uses: The shoreline is within the boundary of Vandenberg Air Force Base.
43 Jalama	Habitats: Rocky cliffs line the northern shore of this segment. Small, narrow, steep, sandy beaches immediately south of the rocky cliffs broaden to the south. Living Resources: Jalama Creek, which is located in the middle portion of the segment, has been identified as an anadromous fish stream. Giant kelp beds are found in this coastal segment. Other Uses: Jalama Beach County Park is located about 1.4 km (0.9 miles) north of Jalama.
44 Point Conception	Habitats: The shoreline is characterized by narrow, steep, sandy beaches with many submerged rocks toward the northern portion of this segment. Living Resources: Kelp beds are located off the east coast of Point Conception. Government Point serves as a bird rookery/ nesting area.

CLEAN SEAS SEGMENT	DESCRIPTION
85 San Miguel Island	Habitats: Cliffs predominate in the shoreline. Occasional gravel pocket beaches and rocky shoreline sections are interspersed throughout the segment. Living Resources: California sea lion, harbor seal, Guadalupe fur seal, northern fur seal, stellar sea lion and northern elephant seal haul-out and use the island for rookeries. Many birds, including endangered species, also breed and nest in the area. Other Uses: Island waters serve as a major fishing area. The island is owned by the U.S. Navy and managed by the National Park Service as a national park. The waters surrounding San Miguel are a State Ecological Reserve and are within the Channel Islands Marine Sanctuary.
86 Santa Rosa Island	Habitat: Predominantly steep or vertical cliffs falling directly into the water with occasional sand/gravel pocket beaches and/or rocky shorelines. Living Resources: Island supports pinniped rookeries and hauling grounds for northern elephant seals, harbor seals, and California sea lions. Waters surrounding island are designated as an Area of Special Significance. Important bird rookery/nesting area. Other Uses: Part of Channel Islands National Park and waters are part of Channel Islands Marine Sanctuary. Numerous boat sites are located on the western shores of Santa Rosa Island and five diving sites are located offshore. Sheep and cattle graze on bluffs along the waterfront. Waters between Santa Rosa and Santa Cruz Island are popular party boat areas.

CLEAN SEAS SEGMENT	DESCRIPTION
87 Santa Cruz Island	Habitat: Cliffs falling directly into water with occasional sand/gravel pocket beaches and rocky shoreline in sheltered areas. Living Resources: Supports rookeries and hauling grounds for northern elephant seals, harbor seals, and California sea lions. Waters surrounding island have been designated as an Area of Special Biological Significance. Important bird rookery/nesting area. Other uses: Santa Cruz Island is part of the Channel Islands National Park and the waters are part of Channel Islands Marine Sanctuary. Boat launch sites are located along all shores of the island. Recreation also includes diving (7 sites on Island) and nature study. Cattle and sheep graze on bluffs. Waters between Santa Cruz and Santa Rosa Island are a popular party boat area. Comments: Currents off Fraser Point (western tip of island) can be extremely dangerous.
88 Anacapa Island	Habitat: Almost entirely vertical cliffs, terraces, and rocky shoreline with a few gravel pocket beaches. Living Resources: Island supports rookeries and hauling grounds for northern elephant seals, harbor seals, and California sea lions. Waters around the island are designated as an Area of Special Biological Significance. Anacapa Island supports the richest tidal pools in southern California. The California brown pelican, an endangered species, has nested on Anacapa for the last two years. Other Uses: Part of Channel Islands National Monument, Channel Islands National Park; waters are part of Channel Islands Marine Sanctuary. Numerous boat launching areas and five diving areas are located on Anacapa's shores. Recreation activities in northern Channel Islands including sportfishing and nature study have historically centered on Anacapa.

7. MARINE MAMMAL & BIRD HABITATS

MARINE MAMMALS AND BIRDS

Marine Mammals: Sea otters, pinnipeds (seals and sea lions), and cetaceans (whales and toothed porpoises) exist in appreciable numbers in the rich oceanic waters off California.

The pinniped species and locations where they are found on or offshore the coastline adjacent to the Santa Maria Basin and Santa Barbara Channel OCS areas are listed in Table C-2-1. Information on the sitings of the most common cetaceans found in these OCS areas is presented in Table C-2-2. The sea otter (Enhydra lutris), which has been designated as a "threatened" species, is present along the central California coast as far south as the Santa Maria River Mouth (Segment No. 31), although individual sea otters have been sighted in the Santa Barbara Channel (UCSC, 1982). Most of the otters in the Santa Maria Basin offshore are bachelor males which migrate northward during summer and fall (Benech, 1982).

Marine and Coastal Birds: Table C-2-3 lists the locations along the central and southern California coast that are used by major groups of birds, and the principal activities that take place in these areas. San Miguel Island (Segment No. 85) is the most important rookery in the Southern California Bight in terms of numbers and species. Anacapa Island (Segment No,. 88) supports the second largest number of seabirds in the Bight (NOAA, 1980).

CLEANUP OF WATERFOWL AND OTHER MARINE ORGANISMS

If a spill threatens waterfowl or marine mammals, the U.S. Fish and Wildlife Service or the National Marine Fisheries Service must be notified. The telephone numbers for these agencies are:

- U.S. Fish and Wildlife Service (213) 436-1183
- National Marine Fisheries Service (213) 548-2575

The U.S. Fish and Wildlife Service has responsibility for capturing and cleaning oiled birds in federal waters. It also has responsibility for taking precautionary measures and initiating cleaning activities, if feasible, for any species that is on the endangered species list. The National Marine Fisheries Service has responsibility for marine mammals under duress from spilled oil.

If birds or marine mammals in state waters or onshore are contaminated by spilled oil, the California Department of Fish and Game normally assumes responsibility for capturing and cleaning the oiled birds and mammals. The number for the California Department of Fish and Game is (213) 590-5106.

The role of the U.S. Fish and Wildlife Service in California in these situations will be to assist in the implementation of the State's plan by providing people and equipment where the need is greatest. Exxon and Clean Seas will provide the necessary assistance during rehabilitation efforts.

If birds are oil-contaminated, the following organization can provide immediate consultation service:

International Bird Rescue Research Center
Aquatic Park
Berkeley, California 94710
Telephone Number: (415) 841-9086

The appropriate agency identified above shall be notified if any severly oiled and obviously sick marine mammals are seen. No attempt is to be made by Exxon to capture them except under specific directions from a wildlife biologist from one of these agencies.

TABLE C-1-2

RESERVES, PRESERVES, MARINE SANCTUARIES, AREAS OF SPECIAL BIOLOGICAL SIGNIFICANCE, BIOLOGICALLY SENSITIVE AREAS, OIL AND GAS SANCTUARIES, AND REFUGES IN VICINITY OF EXXON'S LEASES
(U.S. Fish and Wildlife Service, 1981)

NAME	LOCATION RELATIVE TO CLOSEST EXXON LEASE	PRINCIPAL SPECIES
Ecological Reserves		
Santa Maria Basin:		
. Morro Rock Ecological Reserve (Segment No. 20)	48 km (30 miles) north-northeast of P 0405	Numerous species of nesting shorebirds and seabirds, including the "endangered" American peregrine falcon
. Pismo Lake Ecological Reserve (Segment No. 28)	Reserve is located 0.8 km (0.5 mile) inland of Pismo Beach which is 39 km (24 miles) northeast of P 0405	Wading birds, numerous species of overwintering shorebirds and waterfowl and migrating shorebirds
Santa Barbara Channel:		
. Tide and submerged lands surrounding San Miguel and Anacapa Islands from mean high tide line seaward 1 nautical mile (1.8 km)	Reserve around San Miguel Island is 7 km (4 miles) south of P 0356	Northern fur seals, California sea lions, Stellar sea lions, harbor seals, northern elephant seals, Guadalupe fur seals, and numerous species of nesting shorebirds and seabirds including the "endangered" California brown pelican on Anacapa Island

TABLE C-1-2 (cont.)

NAME	LOCATION RELATIVE TO CLOSEST EXXON LEASE	PRINCIPAL SPECIES
<u>Preserves</u>		
Santa Barbara Channel:		
. Federal Ecological Preserve plus buffer zone seaward of the Goleta-Santa Barbara-Montecito coastal strip extending 2 miles seaward of state waters	P 0238 is immediately south of the buffer zone	N/A
<u>Marine Sanctuaries</u>		
Santa Barbara Channel:		
. Channel Islands Marine Sanctuary encompassing ocean waters surrounding the northern Channel Islands, Santa Barbara Island, Richardson Rock and Castle Rock from the mean high tide seaward 6 nautical miles (10.8 km)	P 0356 and P 0357 are located partially within the Channel Islands Marine Sanctuary. The closest proposed well is located 4 km (2 miles) northeast of the sanctuary	Northern fur seals, California sea lions, Stellar sea lions, harbor seals, northern elephant seals, Guadalupe fur seals, and numerous species of nesting shorebirds and seabirds, including the "endangered" California brown pelican on Anacapa Island

TABLE C-1-2(cont.)

NAME	LOCATION RELATIVE TO CLOSEST EXXON LEASE	PRINCIPAL SPECIES
Areas of Special Biological Significance		
Santa Barbara Channel:		
. Waters around northern Channel Islands to a distance of 1 nautical mile (1.8 km) offshore or the 300-foot isobath, whichever is greater	Area around San Miguel Island is 7 km (4 miles) south of P 0356	Northern fur seals, California sea lions, Stellar sea lions, harbor seals, northern elephant seals, Guadalupe fur seals, and numerous species of nesting shorebirds and seabirds, including the "endangered" California brown pelican on Anacapa Island
. Area between Mugu Lagoon and Latigo Point	59 km (37 miles) east-southeast of P 0231	Harbor seals

TABLE C-1-2 (cont.)

NAME	LOCATION RELATIVE TO CLOSEST EXXON LEASE	PRINCIPAL SPECIES
Biologically Sensitive Areas		
Santa Maria Basin:		
. Nipomo Dunes and Santa Maria River Mouth (Segment No. 31)	32 km (20 miles) east-northeast of P 0405	Wading birds, overwintering waterfowl, overwintering, migrating and nesting shorebirds, and nesting or overwintering waterfowl
. Santa Ynez Lagoon (Segment No. 37)	9 km (6 miles) northeast of P 0438	Numerous species of nesting, migrating or overwintering shorebirds, including "endangered" California least terns
Santa Barbara Channel:		
. Point Conception (Segment No. 44)	6 km (4 miles) north of P 0197	Extensive giant kelp beds, nesting seabirds
. Burmah/Naples Beach	8 km (5 miles) northeast of P 0187	Harbor seals
. Goleta Slough	14 km (8 miles) north of P 0238	Numerous species of shorebirds, wading birds, seabirds, and songbirds including the following "endangered" species: light-footed clapper rails, California black rails, California brown rails, California brown pelicans and Belding savannah sparrows

TABLE C-2-1

INFORMATION ON PINNIPEDS COMMONLY FOUND
OFFSHORE CENTRAL AND SOUTHERN CALIFORNIA
(U.S. Fish and Wildlife Service, 1981; Morejohn, 1977;
BLM, 1981; BLM, 1980; NOAA, 1980; and Daugherty, 1979)

SPECIES	LOCATION	DISTANCE FROM LEASE
Harbor Seals (*Phoca vitulina*)	Santa Maria Basin:	
	. San Simeon Point (Segment No. 10)	79 km (49 miles) north-northwest of P 0404
	. San Simeon Beach State Park (Segment No. 12)	71 km (44 miles) north-northwest of P 0404
	. Cayucos Point (Segment No. 18)	55 km (34 miles) north-northeast of P 0405
	. Diablo Canyon (Segment No. 23)	37 km (23 miles) north-northeast of P 0405
	. Mallagh Landing (Segment No. 26)	37 km (23 miles) north-east of P 0405
	. Pismo Beach (Segment No. 28)	39 km (24 miles) north-east of P 0405
	. Point Sal (Segment No. 33)	30 km (19 miles) east of P 0405
	. Purisima Point (Segment No. 36)	10 km (6 miles) northeast of P 0438
	. Point Perdenales (Segment No. 39)	9 km (6 miles) east of P 0440
	. Point Arguello (Segment No. 40)	10 km (6 miles) east-southeast of P 0440
	Santa Barbara Channel:	
	. Burmah/Naples Beach (Segment No. 56)	8 km (5 miles) northeast of P 0187
	. Devereaux Slough (Segment No. 58)	13 km (8 miles) north of P 0238

TABLE C.2.1(cont.)

SPECIES	LOCATION	DISTANCE FROM LEASE
Harbor Seals (cont.)	. Coal Oil Point (Segment No. 58)	13 km (8 miles) north of P 0238
	. Goleta Rocks (Segment No. 59)	14 km (8.5 miles) northeast of P 0238
	. El Estero (Segment No. 66)	29 km (18 miles) northeast of P 0231
	. Standard Oil Pier (Segment No. 67)	29 km (18 miles) northeast of P 0231
	. Mugu Lagoon (Segment Nos. 77 and 78)	59 km (37 miles) east-southeast of P 0231
	. Bay Cove to Glass Float Beach, San Miguel Island (Segment No. 85)	11.5 km (7 miles) south of P 0356
	. Harris Point to Cuyler Harbor, San Miguel Island (Segment No. 85)	9 km (5 miles) southwest of P 0356
	. Skunk Point, Santa Rosa Island (Segment No. 86)	8 km (5 miles) southeast of P 0360
	. Carrington Point to Northwest Anchorage, Santa Rosa Island, (Segment No. 86)	5 km (3 miles) south-southeast of P 0360
	. Diablo Point to West Point, Santa Cruz Island (Segment No. 87)	7 km (4 miles) south of P 0232
	. Cavern Point, Santa Cruz Island (Segment No. 87)	9 km (6 miles) southeast of P 0231

TABLE C.2.1 (cont.)

SPECIES	LOCATION	DISTANCE FROM LEASE
Harbor Seals (cont.)	. Morse Point, Santa Cruz Island (Segment No. 87)	7 km (4 miles) south of P 0232
	. Frenchys Cove, Anacapa Island (Segment No. 88)	14.5 km (9 miles) east-southeast of P 0231
California Sea Lions (*Zalophus californianus*)	Santa Maria Basin:	
	. Point Piedras Blancas (Segment No. 8)	82 km (51 miles) north-northwest of P 0404
	. White Rock (Segment No. 13)	65 km (40.5 miles) north of P 0405
	. Cayucos Point (Segment No. 18)	55 km (34 miles) north-northeast of P 0405
	. Lion and Pup Rocks (Segment No. 23)	30 km (19 miles) north-east of P 0405
	. Pecho Rock (Segment No. 24)	30 km (18 miles) northeast of P 0405
	. Point Sal (Segment No. 33)	30 km (19 miles) east of P 0405
	Santa Barbara Channel:	
	. Point Bennett to Simmonton Cove, San Miguel Island (Segment No. 85)	12 km (7 miles) southwest of P 0356
	. Richardson Rock, San Miguel Island (Segment No. 85)	18 km (11 miles) west-southwest of P 0356
	. Corral Point, Santa Rosa Island (Segment No. 86)	14 km (9 miles) south-southeast of P 0360

TABLE C.2.1(cont.)

SPECIES	LOCATION	DISTANCE FROM LEASE
California Sea Lions (cont.)	. Frazer Point, Santa Cruz Island (Segment No. 87)	15 km (10 miles) south of P 0354
	. Frenchys Cove, Anacapa Island (Segment No. 88)	14.5 km (9 miles) east-southeast of P 0231
Northern Fur Seal (*Callorhinus ursinus*)	Santa Barbara Channel:	
	. Point Bennett to Simmonton Cove, San Miguel Island (Segment No. 85)	12 km (7 miles) southwest of P 0356
	. Castle Rock, San Miguel Island (Segment No. 85)	14 km (8.5 miles) southwest of P 0356
	. Richardson Rock, San Miguel Island (Segment No. 85)	18 km (11 miles) west-southwest of P 0356
Stellar Sea Lion (*Eumetopias jubatus*)	Santa Maria Basin:	
	. Point Piedras Blancas (Segment No. 8)	82 km (51 miles) north-northwest of P 0404
	. Lion Rock (Segment No. 33)	30 km (19 miles) northeast of P 0405
	Santa Barbara Channel:	
	. Point Bennett to Simmonton Cove, San Miguel Island (Segment No. 85)	12 km (7 miles) southwest of P 0356

TABLE C.2.1 (cont.)

SPECIES	LOCATION	DISTANCE FROM LEASE
Northern Elephant Seal (*Mirounga angustirostris*)	Santa Maria Basin: . Point Arguello (Segment No. 40)	10 km (6 miles) east-southeast of P 0440
	Santa Barbara Channel: . Point Bennett to Simonton Cove, San Miguel Island (Segment No. 85)	12 km (7 miles) southwest of P 0356
Guadalupe fur seal (*Arctocephalus townsendi*)	Santa Barbara Channel: . Point Bennett, San Miguel Island (Segment No. 85)	17 km (11 miles) southwest of P 0356

TABLE C-2-2

CETACEANS COMMON TO THE SANTA MARIA BASIN
OFFSHORE AND SANTA BARBARA CHANNEL
(UCSC, 1982; Daugherty, 1979; Morejohn, 1977; BLM, 1981;
BLM, 1980; Gundlach et al., 1982; NOAA, 1980)

SPECIES	SITINGS IN SANTA MARIA BASIN	SITINGS IN SANTA BARBARA CHANNEL
Pacific white-sided dolphin (Lagenorhynchus obliquidens)	Common summer through winter; Peak in autumn	Sitings all year with peaks in summer near San Miguel Island
Northern right-whale dolphin (Lissodelphis borealis)	Sitings in summer and autumn	Sitings winter and spring
Risso's dolphin (Grampus griseus)	Sitings in winter and autumn; Peak in autumn	Sitings year-round; Most abundant in late spring, summer, and early autumn
Dall's porpoise (Phocoenoides dalli)	Sitings year-round with only minor fluctuations in abundance and concentration	Sitings all year; Most common during winter
Harbor porpoise (Phocoena phocoena)	No dramatic seasonal fluctuations	Not common
Sperm whale (Physeter catodon)*	Sitings only in autumn	Not common
Pilot whale (Globicephala scammoni)	Sitings only in autumn	Sitings in autumn and early winter
Gray whale (Eschrichtius robustus)*	Sitings from late autumn to spring	Sitings between early winter and early spring
Beaked whale (Ziphiidae)	Sitings in summer	Not common

* Designated as "endangered"

SPECIES	SITINGS IN SANTA MARIA BASIN	SITINGS IN SANTA BARBARA CHANNEL
Humpback whale (Megaptera novaeangliae)*	Sitings in summer and autumn; Peak in autumn	Sitings between winter and early spring
Blue whale (Balaenoptera musculus)*	Sitings in summer	Not common
Fin whale (Balaenoptera physalus)	Not common	Sitings between late autumn and early winter
Killer whale (Orcinus orca)	Sitings infrequent	Sitings year-round; More abundant with gray whales
Common dolphin (Delphinus delphis)	Not common	Exceptionally heavy use of the Channel all year with peaks during cool water periods
Minke whale (Balaenoptera acutorostrata)	Not common	Sitings year-round; Most abundant in spring and summer

* Designated as "endangered"

TABLE C-2-3

MAJOR BIRD HABITATS PRESENT IN THE SANTA MARIA BASIN OFFSHORE AREA AND SANTA BARBARA CHANNEL (U.S. Fish and Wildlife Service, 1981)

CLEAN SEAS SEGMENT	SHORE-BIRDS	SEABIRDS	WATERFOWL	WADING BIRDS	RAPTORS
SANTA MARIA BASIN:					
8 Point Piedras Blancas	n	n	-	-	-
10 San Simeon Point	-	n	-	-	-
11 Piedra Blanca	w,m	-	w	-	-
12 Cambria Rock	w,m	-	w	-	-
17 Cayucos Point	n	-	-	-	-
20 Morro Bay*	n	n	-	-	n
21 Hazard Canyon*	n	-	-	-	-
22 Point Buchon	n	n	-	-	-
24 Deer Canyon	n	n	-	-	-
25 Point San Luis	n	n	-	-	-
27 Shell Beach	n	n	-	-	-
28 Pismo Beach	n	n	-	-	-
29 Oceano	w	-	-	p	-
31 Guadalupe*	w,m	-	w	p	-
32 Mussel Point*	n	-	-	-	-
35 Vandenberg*	n	-	-	-	-
36 Purisima Point*	n	-	-	-	-
37 Lompoc Landing*	n,w,m	-	w,m	p	w
39 Point Perdenales	-	n	-	-	-
40 Point Arguello	n	n	-	-	-

n - nesting
w - overwintering
m - migrating
p - present
* - "endangered" or "threatened" bird species present

CLEAN SEAS SEGMENT	SHORE-BIRDS	SEABIRDS	WATERFOWL	WADING BIRDS	RAPTORS
<u>SANTA BARBARA CHANNEL</u>:					
44 Point Conception	-	n	-	-	-
59 Goleta Point	w,m	-	m	w,n	-
66 Sandy Point	w,m	-	-	n	-
71 Ventura River	w,m	-	w,m	-	-
72 Ventura	n	m	-	-	-
77 Laguna Point	w,m	m	w	n	-
85 San Miguel Island*	n	n	-	-	-
86 Santa Rosa Island	n	n	-	-	-
87 Santa Cruz Island	n	n	-	-	-
88 Anacapa Island*	n	n	p	-	-

n - nesting
w - overwintering
m - migrating
p - present
* - "endangered" or "threatened" bird species present

TABLE C-2-4

POSSIBLE EFFECTS OF OILING
ON SENSITIVE LIVING RESOURCES
(Gundlach et al., 1982)

LIVING RESOURCE	POSSIBLE IMPACTS
Cetaceans	. Stress may occur through ingestion of oil-contaminated food, oil intake through blowholes, eye irritation, and skin absorption.
Pinnipeds	. Eye irritation. . Death of already stressed seals (emaciated, late molting, captive), from additional stress of oil contamination. . Thermoregulatory stress in preweaned pups, which have not yet developed insulting fat layers. . Disturbance of feeding and reproductive activities by aircraft and cleanup activities. . Ingestion of oil during nursing by young.
Diving Birds	. May dive or swim into oiled waters. . Sometimes form large feeding flocks; these would be especially susceptible to mass oiling.
Waterfowl	. Coastal species would be especially vulnerable; Brant feed on seagrass flats in very shallow waters; may be oiled in water, or may be deprived of access to seagrass beds. . Ducks dive for food and are found in coastal or offshore waters; contamination could result from swimming in oiled water; they may land in oil-calmed water for evening roost; they sometimes form large rafts which might result in massive oiling; they may dive through or surface in oiled water.
Shorebirds	. May feed or roost on oil-contaminated beaches. . May ingest contaminated food. . May ingest oil when preening contaminated feathers.

LIVING RESOURCE	POSSIBLE IMPACTS
Alcids	. Form large colonies, subject to mass oiling. . If disturbed, will fly from nests into water. . May attempt to land in oil-calmed water. . Dive into water to escape danger. . May feed in oiled water.
Shellfish	. Oil on exposed sand during low tide would flow down burrows and perhaps be ingested by clams inhabiting tidal flats or beaches. . Stressed clams would move to surface, becoming more exposed to oil and predation. . Individuals in planktonic stages would be exposed to oil in the water column. . Clams and mussels on rocky shores would be subject to physical damage.

REFERENCES

Benech, Susan. 1982. Personal Communication.

Bureau of Land Management. 1981. Final Environmental Impact Statement, Proposed 1982 Outer Continental Shelf Oil and Gas Lease Sale Offshore Southern California, OCS Sale No. 68.

Bureau of Land Management. 1980. Final Environmental Impact Statement, Proposed 1981 Outer Continental Shelf Oil and Gas Lease Sale Offshore Central and Northern California, OCS Sale No. 53.

Bureau of Land Management. 1979. Final Environmental Impact Statement, Proposed 1979 Outer Continental Shelf Oil and Gas Lease Sale Offshore Southern California, OCS Sale No. 48.

Dames and Moore. 1980. Environmental Impact Report/Environmental Assessment, Union Oil Company Platform Gina and Platform Gilda Project.

Daugherty, A. E. 1979. Marine Mammals of California. Published by the University of California Sea Grant Marine Advisory Program and the California Department of Fish and Game. Third Revision.

Gundlach, E. R.; Thebeau, L. C.; Sadd, J. L.; Pavia, R.; and Ernst, W. D. 1982. Sensitivity of Coastal Environments to Spilled Oil: Southern California. Prepared by Research Planning Institute, Inc. for the National Oceanic and Atmospheric Administration.

Johnson, L. and Abell, H. 1977. Recreation Site Vulnerability. In A Summary of Knowledge of the Central and Northern California Coastal Zone and Offshore Areas. Prepared for the Bureau of Land Management.

Jones & Stokes Associates, Inc. 1981. An Ecological Characterization of the Central and Northern California Coastal Region. Prepared for the Bureau of Land Management and the U.S. Fish and Wildlife Service.

Morejohn, Victor G. 1977. Marine Mammals. In A Summary of Knowledge of the Central and Northern California Coastal Zone and Offshore Areas. Prepared for the Bureau of Land Management.

National Oceanic and Atmospheric Administration. 1980. Final Environmental Impact Statement On The Proposed Channel Islands Marine Sanctuary.

University of California, Santa Cruz. 1982. Marine Mammals and Seabird Study Central and Northern California. Prepared for the Bureau of Land Management. POCS Technical Paper No. 82-1.

U.S. Fish and Wildlife Service. 1981. Pacific Coast Ecological Inventory.

Woodward-Clyde Consultants. 1980. Oil Spill Cleanup Manual for Clean Seas.

8. EQUIPMENT

TABLE 1

PROPOSED OIL SPILL CONTROL EQUIPMENT*

POINT PEDERNALES PLATFORM (Shamrock)

1	32 ft. Munson boat, twin 150 hp/ob or equivalent
1	Walosep W-1 skimmer with powerpack and 1100 gallon storage/recovery container
1	Kepner 2500 gal. floating storage bag
1500 ft.	Kepner 18" x 23" Sea Curtain on boom reel
15	Bales 3M Sorbent, Type 156
2	Drums of Corexit 9527 chemical dispersant
20	Gallons of Corexit OC-5 surface collecting agent
1	Hudson hand sprayer for dispensing chemical agents
	Assorted hand tools and storage containers

* All equipment and materials are subject to change to be state-of-the-art and will comply with MMS guidelines at the time of platform installation.

Note:
As required by Pacific OCS Order 7, all oil spill equipment and materials shall be inspected monthly and maintained in a state of readiness for use. The results of the inspection shall be recorded and maintained at the site.

TABLE 2

EXISTING POLLUTION CONTROL EQUIPMENT

HONDO A PLATFORM

1500 ft. Kepner 18" x 23" Sea Curtain on boom reel

1 Komara mini-skimmer, including pump, engine and hose

1 Dunlop 1200 Imp. gal. (34 bbl) Dracone floating storage bag

20 Cyalume lightsticks

15 bales of 3M sorbent, type 156

2 drums of Corexit "9527" dispersant

20 gallons of Corexit OC-5 surface collecting agent

1 Hudson hand sprayer for dispensing chemical agents

1 21' Boston Whaler with two 70 hp outboard engines

(OS&T) EXXON SANTA YNEZ

1000 ft. of Model 4300 Expandi-boom, assembled on pallet

1 Walosep W-1 oil recovery system (skimmer)

1 5000 gallon Kepner floating storage bag

20 Cyalume lightsticks

15 bales of 3M sorbent, type 156

2 drums of Corexit "9527" dispersant

20 gallons of Corexit OC-5 surface collecting agent

1 Hudson hand sprayer for dispensing chemical agents

1 32' MonArk workboat, Twin-CV53N Detroit Diesel inboard engines, dedicated for oil spill containment and recovery

Crewboats servicing Hondo facilities to be adapted with HIAB-20 cranes to handle Walosep recovery system.

TABLE 3

MR. CLEAN I
OIL SPILL RESPONSE VESSEL
(Moored at S. B. Harbor)

Vessel

- 136'x36' (supply type) USCG certified
- 90'x30' clear deck space
- Navigation Aids (radar, SSB radio, VHF radio, LORAN)
- Transit speed, 10-12 knots
- Two V-12 800 hp diesel engines
- Fuel capacity 99,500 gals., potable water 7400 gal.
- Two 60 kilowatt electric power generators
- Galley and sleeping quarters for 12 people
- Emergency skimmed oil/water storage (4000 bbls.) (to be used only until tank barge is on scene)

Crew

- Four men during oil spill operation
- Two men on duty 24 hrs/day, 7 days/week
- One man on 24 hour call at all times
- Two hour callout and underway
- Clean Seas personnel will supplement crew during oil spill response

Equipment

- Cyclonet Model 100 skimmer, with accessory equipment
- Walosep stationary skimmer, with accessory equipment
- Vikoma Seapack (1600' boom)
- Expandi boom Model 4300 (1500' on reel)
- Goodyear Sea Sentry Boom (12"x24"x2000')
- Oil/Water separator system (90 bbl. capacity)
- One each Kepner 5000 gal. & 1200 gal. floating storage bags
- Chemical dispersant and applicator system (5 drums Corexit 9527)
- One 32' boom boat/twin 175 hp OB
- One 14' alum. skiff/9.8 hp OB
- One 14' alum. lifeboat/9.8 hp OB
- Pedestal crane-12 ton capacity
- Absorbant material, hand tools, pumps, hoses, towlines, etc.

TABLE 4

MR. CLEAN II
OIL SPILL RESPONSE VESSEL
(Moored at Port San Luis)

Vessel

- 130'x30' (supply type) USCG certified
- 85'x25' clear deck space (estimated)
- Navigation Aids (radar, SSB radio, VHF radio, LORAN)
- Transit speed, 10-12 knots
- Twin 16-V-92 diesel engines
- Fuel capacity 25,000 gals., potable water capacity unknown
- Electrical generation capacity, 2-75 KW generators
- Galley and sleeping quarters for 12 people

Crew

- Four men during oil spill operation
- Two men on duty 24 hrs/day, 7 days/week
- One man on 24 hour call at all times
- Two hour callout and underway
- Clean Seas personnel will supplement crew during oil spill response

Equipment

- Two Offshore Devices advancing skimmers and accessory equipment
- One Walosep stationary skimmer and accessory equipment
- Vikoma Seapack (1600' boom)
- Expandi boom Model 4300 (1500' on reel)
- Goodyear heavy duty boom (12"x24"x1210')
- Oil/Water separator system (90 bbl. capacity)
- Four 5000 gal. Kepner floating storage bags
- Chemical dispersant and applicator system (5 drums Corexit 9527)
- One 32' Raider boom boat/twin 175 hp OB
- One 14' alum. skiff/9.8 hp OB
- One 14' alum. lifeboat/9.8 hp OB
- Pedestal crane-14 ton capacity
- Absorbant material, hand tools, pumps, hoses, towlines, etc.

TABLE 5

EQUIPMENT STORED IN CARPINTERIA YARD & SANTA BARBARA HARBOR

Equipment	Total No.
CARPINTERIA YARD	
BOOMS	
Vikoma Seapack	1 - 1600'
Sea Sentry (Goodyear)	1210'
B-T boom	2000'
SKIMMERS	
Floating weirs	3
Komara Mini	1
Cyclonet 050	1
Mark II (1 w/125 hp engine, 1 w/2-70 hp engines	2
OIL MOPS	
400' 9" Mop & MK-II-9 machine	1
BOATS	
21' skiff/OB	1
19' skiff/OB	1
14' skiff/OB	1
10' rubber raft/OB	1
VEHICLES	
Command Van	1
2-1/2 ton rapid response truck	1
1/2 ton pickup	2
3/4 ton personnel van	1
STORAGE BAGS & TANKS	
1200 gal. bag	1
100 bbl. tanks	4
MISCELLANEOUS	
Pumps	
Hoses	
Sorbents	
100 Drum tank trailers of corexit 9527 dispersant	2
Drums of corexit 9527	55
SANTA BARBARA HARBOR	
Tide-Mar VII, 160'x39' 7840 bbl. storage barge	1
CSI skimmer with 5000 gal. storage bag	1
16" Kepner boom	500'

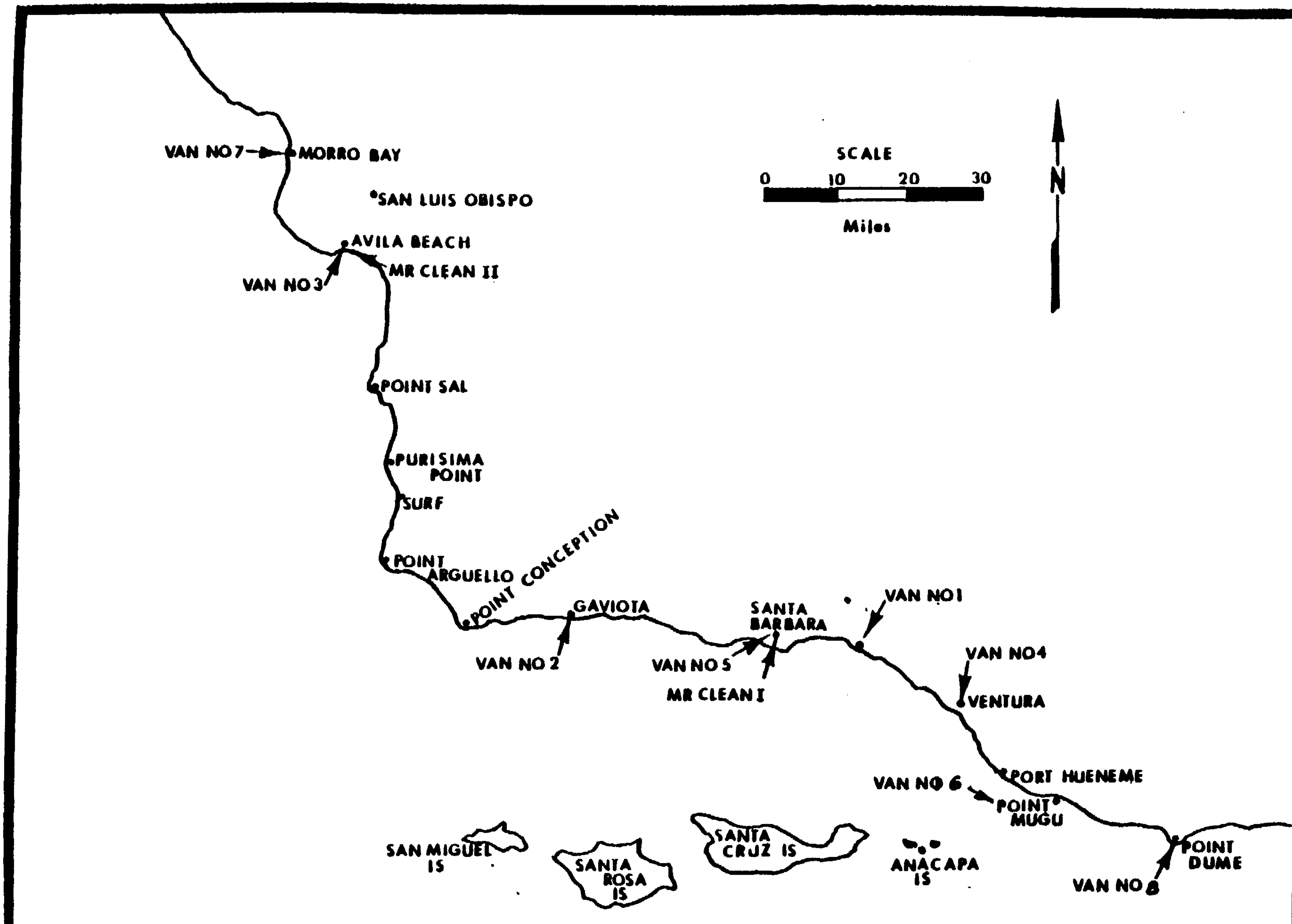


FIGURE II-13 LOCATION OF CLEAN SEAS OIL SPILL RESPONSE VANS

TABLE 6

CLEAN SEAS VAN #1*
GREEN
CARPINTERIA YARD

1.	16" Kepner Boom	800'
2.	8" Kepner Boom	800'
3.	Sorbents	
	Conwed:	
	Boom	5 bxs/24' ea
	Sweeps	5 bxs/17"x17"/120 per
	Rugs	2 rolls/300' per
	Blankets	2 rolls/200' per
	3-M Company:	
	Boom	15 bxs/40' ea
	Sweeps	2 bxs/100' per
	Sheets	10 bxs/100' per
	Dow:	
	Blankets	20 bxs/1 per
	Rug	2 bxs/100 per
4.	Oil Snare	1 bx/30 ea
5.	Oil Mops	
6.	51 T Acme Skimmer w/1200 gal. bag	1 ea
7.	3" 25' suction hose w/3" valves	1 ea
8.	3" 25' discharge hose	2 ea
9.	1/2" 30' buoy lines w/buoys	4 ea
10.	Hose floats	5 ea
11.	Pitch forks	2 ea
12.	Misc. Tools	
13.	55 gal. drums	2 ea
14.	Anchors 3/40 lb., 1/22 lb.	4 ea
15.	Anchor lines 1/2" 200' (nylon)	4 ea
16.	200' Crown line 1/2" (poly)	4 ea
17.	5/8" wire towing bridles	1 ea
18.	Chemical lights	7 ea
19.	Flares	2 ea
20.	Hand cleaner and rags	
21.	Life Jackets	4 ea

*As of February 1983

TABLE 7

CLEAN SEAS VAN #2*

BLUE

AMINOIL TERMINAL/GAVIOTA

1.	16" Kepner Boom	800'
2.	Sorbents	
	Conwed:	
	Boom	10 bxs/24' per
	Sweeps	5 bxs/17"x17"/120 ea
	3-M Company:	
	Sheets	10 bxs/100' per
	Sweeps	2 bxs/100' per
	Dow:	
	Bags	1 bx/100 per
	Blankets	20 bxs/1 per
3.	Oil Snare	1 bx/30 per
4.	Chemical lights	5 ea
5.	51 T Acme Skimmer w/5000 gal. bag	1 ea
6.	Skimmer Hose	2 ea
7.	25' 3" Hose	1 ea
8.	100' 1/2" and 3/4" tow line (nylon)	1 ea
9.	1000' 1/4" line (manila)	1 ea
10.	Hose Floats	5 ea
11.	Life Preservers	4 ea
12.	Pitchforks	2 ea
13.	Rake	1 ea
14.	Misc. Tools	
15.	55 gal. drums	2 ea
16.	30' 1/2" buoy line w/buoy	4 ea
17.	Anchor line 200' 1/2" (nylon)	4 ea
18.	Crown line 200' 1/2" (nylon)	4 ea
19.	Anchors 3/40 lb., 1/22 lb.	4 ea
20.	3" valve	2 ea

*As of February 1983

TABLE 8

CLEAN SEAS VAN #3*

RED

AVILA BEACH

1.	43" Expandi Boom	1300'
2.	Mini Max Boom	1000'
3.	Sorbents	
	Conwed:	
	Boom	5 bxs/24' per
	Sweeps	3 bxs/17"x17"/120 per
	3-M Company:	
	Boom	5 bxs/40' per
	Sheets	5 bxs/100' per
	Sweeps	2 bxs/100' per
	Dow:	
	Bags	1 bx/100 per
	Blankets	20 bxs/1 per
4.	Oil Snare	1 bx/30 per
5.	51 T Acme Skimmer w/1200 gal. bag	1 ea
6.	3" valves	2 ea
7.	Skimmer 3" 50' hose	2 ea
8.	3" 25' discharge hose	1 ea
9.	Hose floats	5 ea
10.	30' 1/2" (poly) buoy line w/buoy	4 ea
11.	100' 1/2" line (poly)	1 ea
12.	100' 3/4" tow line (nylon)	1 ea
13.	Anchor line 200' 1/2" (nylon)	4 ea
14.	Anchor crown line 200' 1/2" (poly)	4 ea
15.	Anchors 3/40 lbs., 1/22 lb.	4 ea
16.	Life jackets	4 ea
17.	Pitch forks	2 ea
18.	Rake	1 ea
19.	Misc. tools	
20.	55 gal. drums	2 ea
21.	14' aluminum boat w/OB	1 ea
22.	Chemical lights	5 ea

*As of February 1983

TABLE 9

CLEAN SEAS VAN #4*

YELLOW

VENTURA (FOR PT. HUENEME & CHANNEL ISLANDS)

1.	43" Expandi Boom	3200'
2.	30" Expandi Boom - 10 Sect.	825'
3.	Sorbents	
	Conwed:	
	Blanket	1 roll/200' per
	3-M Company:	
	Booms	20 bxs/40' per
	Sheets	11 bxs/100' per
	Sweeps	5 bxs/100' per
	Blanket	1 roll/150' per
	Dow:	
	Blankets	20 bxs/1 per
	Bags	1 bx/100 per
4.	Oil Snare	1 bx/30 per
5.	51 T Acme Skimmer	1 ea
6.	1200 gal. bag w/camlocks	1 ea
7.	3" valves	2 ea
8.	3" 50' discharge hose	2 ea
9.	Hose floats	5 ea
10.	Life jackets	4 ea
11.	Pitch forks	2 ea
12.	Misc. Tools	
13.	55 gal. drums	2 ea
14.	Anchors 4/20 lbs.	4 ea
15.	200' 1/2" anchor line (nylon)	4 ea
16.	200' 1/2" crown line (poly)	4 ea
17.	30' 1/2" buoy line w/buoys (poly)	4 ea
18.	3/4" tow line (nylon)	2 ea

*As of February 1983

TABLE 10

CLEAN SEAS VAN #5*

BLACK

SANTA BARBARA

1.	Super Max Boom	1500'
2.	Sorbents	
	Conwed:	
	Blanket	1 roll/35" 200'/1 ea
	Rug	1 roll/40" 300'/1 ea
	3-M Company:	
	Booms	3 bxs/40' per
	Sheets	3 bxs/100' per
3.	39 T Acme Skimmer	1 ea
4.	1200 gal. bag	1 ea
5.	3" 50' Skimmer hose	2 ea
6.	3" valves	2 ea
7.	30' 1/2" buoy line w/buoys (poly)	4 ea
8.	200' 1/2" anchor line (nylon)	4 ea
9.	200' 1/2" anchor crown line (poly)	4 ea
10.	Anchors 4/22 lbs.	4 ea
11.	3/4" 100' tow lines (nylon)	2 ea
12.	Misc. line 1/2" (nylon and poly)	
13.	Hose floats	5 ea
14.	Pitch forks	1 ea
15.	Misc. tools	
16.	55 gal. drums	2 ea
17.	Flares	2 ea
18.	Life jackets	4 ea

*As of February 1983

TABLE 11

CLEAN SEAS VAN #6*

WHITE

PT. MUGU

1.	30" Expandi Boom -34 Sect.	2805'
2.	8" Mini Max Boom	1000'
3.	Sorbents	
	3-M Company:	
	Boom	11 bxs/40' per
	Sheets	10 bxs/100' per
	Sweeps	2 bxs/100' per
	Dow:	
	Bags	1 bx/100 per
	Blankets	20 bxs/1 per
4.	Oil Snare	1 bx/30 per
5.	Chemical lights	5 ea
6.	51 T Acme Skimmer w/1200 gal. bag	1 ea
7.	3" 25' sus. hose	1 ea
8.	25' 3" discharge hose	1 ea
9.	3" valve	2 ea
10.	30' 1/2" (poly) buoy line w/ buoys	4 ea
11.	100' 1/2" and 3/4" tow line (nylon)	1 ea
12.	1000' 1/4" Line (manila)	1 ea
13.	Hose floats	5 ea
14.	Life preservers	4 ea
15.	Pitchfork	2 ea
16.	Rake	1 ea
17.	Misc. Tools	
18.	55 gal. drums	2 ea
19.	Anchor 4/22 lb.	4 ea
20.	Anchor lines 200' 1/2" (nylon)	4 ea
21.	Crown line 200' 1/2" (poly)	4 ea
22.	Oil Mop (Engine) #1	1 ea
23.	400' of Mop, 9"	1 ea

*As of February 1983

TABLE 12

CLEAN SEAS VAN #7*

BROWN

MORRO BAY

1.	30" Expandi Boom - 7 Sect.	660'
2.	43" Expandi Boom - 32 Sect.	1600'
3.	Sorbents	
	3-M Company:	
	Booms	5 bxs/40' per
	Sheets	15 bxs/100' per
	Sweeps	5 bxs/100' per
	Dow:	
	Bags	1 bx/100 per
	Blankets	20 bxs/1 per
4.	Oil Snare	1 bx/30 per
5.	Life Preservers	4 ea
6.	Misc. Tools	
7.	Pitchforks	2 ea
8.	Rakes	2 ea
9.	55 gal. drums	2 ea
10.	Anchors 4/22 lb.	4 ea
11.	Anchor line 200' 1/2" (nylon)	4 ea
12.	Buoy lines 30' 1/2" (poly) w/buoy	4 ea
13.	Tow line 100' 3/4" (nylon)	1 ea
14.	1000' 1/4" line (manila)	1 ea
15.	200' 1/2" (poly) crown lines	4 ea

*As of February 1983

TABLE 13

CLEAN SEAS VAN #8*

ORANGE

PT. DUME

1.	30" Expandi Boom - 12 Sections	990'
2.	8" Kepner Boom	1200'
3.	Sorbents	
	3-M Company:	
	Booms	5 bales/40' per
	Sheets	15 bales/100' per
	Sweeps	5 bales/100' per
	Dow:	
	Bags	1 bx/100 per
	Blankets	20 bxs/1 per
4.	Oil Snare	1 bx/30 per
5.	Life Preservers	4 ea
6.	Misc. Tools	
7.	Pitchforks	2 ea
8.	Rakes	2 ea
9.	55 gal. drums	2 ea
10.	Anchors 4/22 lb.	4 ea
11.	Anchor line 200' 1/2" (nylon)	4 ea
12.	Crown line 200' 1/2" (poly)	4 ea
13.	Tow line 100' 3/4" (nylon)	1 ea
14.	1000' 1/4" line (manila)	1 ea
15.	Buoy line 30' 1/2" (poly) w/buoys	4 ea

*As of February 1983

605 OIL STORAGE

Tide-Mar VII Barge

Description. The Tide-Mar VII is a 641-ton tank barge 160 feet long and 39 feet wide. Its ten tanks have an aggregate capacity of 7840 barrels. All of the tanks are controlled from the pump room just forward of the engine room. The Tide-Mar VII can be used in two ways -- either as a seagoing collection center for oil recovered from a variety of equipment or by towing directly behind a high-capacity skimmer such as the CS Skimmer.

Deployment Instructions.

1. Load Stang portable pump onto forward deck of Tide-Mar VII.
2. Use tug to tow to site.
3. Line up valves as shown in Table 600-7 to fill desired tanks.
4. Attach filling hose at port or starboard cofferdam. Forward pipes fill the four midship tanks, and the after pipes are for filling the remaining six tanks. Tank filling is by gravity or external pumping (usually the Stang portable unit) only.
5. After recovery of oil, the Tide-Mar VII is off-loaded by using its self-contained pumps and the discharge valve arrangement shown in Table 600-8.

Steel Tanks

Description. CS has three types of steel oil storage tanks each of 100 barrels capacity, for a total of seven tanks.

- Oil holding tanks (4): these tanks are rectangular
- Oil separation tanks (2): these tanks are cylindrical and have fittings for both oil and water
- Oil vacuum tank (1)

Deployment Instructions. These tanks may be used with any of CS 's oil recovery equipment and can be used from barge, work boat, truck, or on shore.

Floating Storage Bags (Kepner)

Description. CS uses 1200-gal and 5000-gal floating storage bags. The bags are useful for passive storage near a stationary skimmer or can be towed behind and filled directly by a moving skimmer. These bags can be used in the latter fashion with Mark II, CS , Cyclonet 050 skimmer, or the Sea Dragon. These bags should always be towed at low speed (less than 2 knots) and should never be towed into port unless absolutely necessary. Towing of these bags should always take weather and sea conditions into account to avoid possible damage to the bags.

Deployment Instructions.

1. Untie the bag hold-downs.
2. Close all drain-and-vent valves on bag.
3. Connect filling hose.
4. Attach towing (or anchoring) lines.
5. Lower aft end of bag into water and proceed until entire bag is deployed.
6. Adjust towing lines to take all strain off of filling hose.

Table 600-7. VALVE ARRANGEMENTS FOR GRAVITY FILLING OF TIDE-MAR VII CARGO TANKS

	Stations	Open:*
Tank #1:	STBD	56-41-47-20
Tank #1:	PORT	65-45-47-20
Tank #2:	STBD	56-41-47-46-4
Tank #2:	PORT	65-45-41-47-4
Tank #3:	STBD	54-18-13
Tank #3:	PORT	63-5-12-13
Tank #4:	STBD	54-18-12-61
Tank #4:	PORT	63-5-61
Tank #5:	STBD	54-18-17
Tank #5:	PORT	63-5-12-17
Tank #6:	STBD	54-18-12-60
Tank #6:	PORT	63-5-60
Tank #7:	STBD	56-41-47-30
Tank #7:	PORT	45-47-30
Tank #8:	STBD	56-41-47-46-24
Tank #8:	PORT	65-45-47-46-24
Tank #9:	STBD	56-41-47-27
Tank #9:	PORT	65-45-47-27
Tank #10:	STBD	56-41-47-46-00
Tank #10:	PORT	65-45-47-46-00

*All other valves remain closed.

Table 600-8. VALVE ARRANGEMENTS FOR DISCHARGING CARGO AND BALLASTING OF TIDE-MAR VII CARGO TANKS

PUMP #1		PUMP #1	
Ballasting		**Discharging**	
open		open	
Tank #1	40-50-31-33-35-22-21-20	Tank #1	40-23-22-21-47-41-46
Tank #2	40-50-31-33-35-22-21-46-4	Tank #2	40-2-37-33-35-22-21-47-41-56
Tank #7	40-50-31-33-35-22-21-30	Tank #7	40-28-35-22-21-47-41-56
Tank #8	40-50-31-33-35-22-21-46-24	Tank #8	40-26-33-35-22-21-47-41-56
Tank #9	40-50-31-33-35-22-21-27	Tank #9	40-29-35-22-21-47-41-56
Tank #10	40-50-31-33-35-22-21-46-00	Tank #10	40-25-33-35-22-21-47-41-56
PUMP #2		PUMP #2	
Ballasting		**Discharging**	
open		open	
Tank #1	34-50-31-37-2-3-46-20	Tank #1	34-23-35-33-37-2-3-46-47-45-65
Tank #2	34-50-31-37-2-3-4	Tank #2	34-1-2-3-46-47-45-65
Tank #7	34-50-31-37-2-3-46-30	Tank #7	34-28-33-37-2-3-46-47-45-65
Tank #8	34-50-31-37-2-3-24	Tank #8	34-26-37-2-3-46-47-45-65
Tank #9	34-50-31-37-2-3-46-27	Tank #9	34-29-33-2-3-46-47-45-65
Tank #10	34-50-31-37-2-3-00	Tank #10	34-25-37-2-3-46-47-45-65
		PUMP #3	
		Discharging	
		open	
		Tank #3	38-14-57-16-18-54
		Tank #4	38-11-58-57-16-18-54
		Tank #5	38-15-57-16-18-54
		Tank #6	38-9-58-57-16-18-54
PUMP #5		PUMP # 5	
Pressure to Fire Mains		**Valve Positions**	
		open	
		#50-#43 and valve on deck	
PUMP #6*		PUMP #6	
Ballasting		**Discharging**	
open		open	
Tank #1	38-50-49-8-36-33-35-22-21-20	Tank #1	38-23-35-32-49-8-36-37-2-3-46-47-45-65
Tank #2	38-50-49-8-36-37-2-3-4	Tank #2	2-38-1-37-31-49-8-36-37-3-46-45-65
Tank #7	38-50-49-8-36-37-2-3-47-30	Tank #7	38-28-32-49-8-36-37-2-3-46-47-45-65
Tank #8	38-50-49-8-36-2-3-24	Tank #8	38-26-31-49-8-36-37-2-3-46-47-45-65
Tank #9	38-50-49-8-36-37-2-3-27	Tank #9	38-29-32-49-8-36-37-2-3-46-47-45-65

*Pump #6 will perform all functions of Pump #5 but will only be used in an emergency.

OIL SPILL RESPONSE - TRANSPORTABLE RADIO SYSTEM

EXXON COMMUNICATIONS EQUIPMENT
(Stored in Houston/Onsite within 24 hours)

Equipment:

UHF PORTABLES (20 Units)	OSR 1,2,3,4
UHF MOBILES(AUTO/BOAT) & 4 PORTABLES	OSR 5,6
UHF BASE STATION	OSR 7
UHF REPEATER WITH LOCAL AND REMOTE CONTROL	OSR 8
VHF MARINE & AERONAUTICAL RADIO	OSR 9
RECORDER AND SCANNER	OSR 10
HIGH FREQUENCY SINGLE SIDE BAND BASE (HF-SSB)	OSR 11
MOBILEFONE (BELL SYSTEM IMTS)	OSR 12
TOOL KIT	OSR 13
TEST EQUIPMENT, CABLES, & SPARES	OSR 14, 15
LORAN C, PORTABLE NAVIGATION SYSTEM	OSR 16
WEATHER STATION	OSR 17
VHF PORTABLES (Co-Op & Marine)	OSR 18
VHF BASE "	OSR 19
OSR BALLOON & REPEATER FOR UHF	OSR 20, 21

Features:

- Van or Stand-alone operations
- Power from commercial 110 VAC or 12 volt battery system
- Air Shipment - All units check as baggage and are self contained
- All domestic licenses and permits enclosed for FCC Authorization
- Set Up for operations : 4 Hours by Technical Personnel
- Shipping Weight for equipment alone: 1000 Pounds - 21 Boxes

20 PORTABLES (OSR 1-4)
Repeater (OSR 8)
Base Station (OSR 7)

2 Mobiles & 4 Portables
Auto/Boat Units (OSR 5 & 6)

U H F S Y S T E M

Exxon & Others - Petroleum Users

454 / 459 MHZ

5 PORTABLES (OSR 18)
Base or Mobile Station (OSR 19)

V H F S Y S T E M

Co-Op Operations
Marine Channels 6 & 16
Exxon & Others

P O I N T T O P O I N T S Y S T E M

HIGH FREQUENCY RADIO (OSR 11)
MOBILE FONE (OSR 12)

SPECIAL ON SCENE COMMANDERS SYSTEM

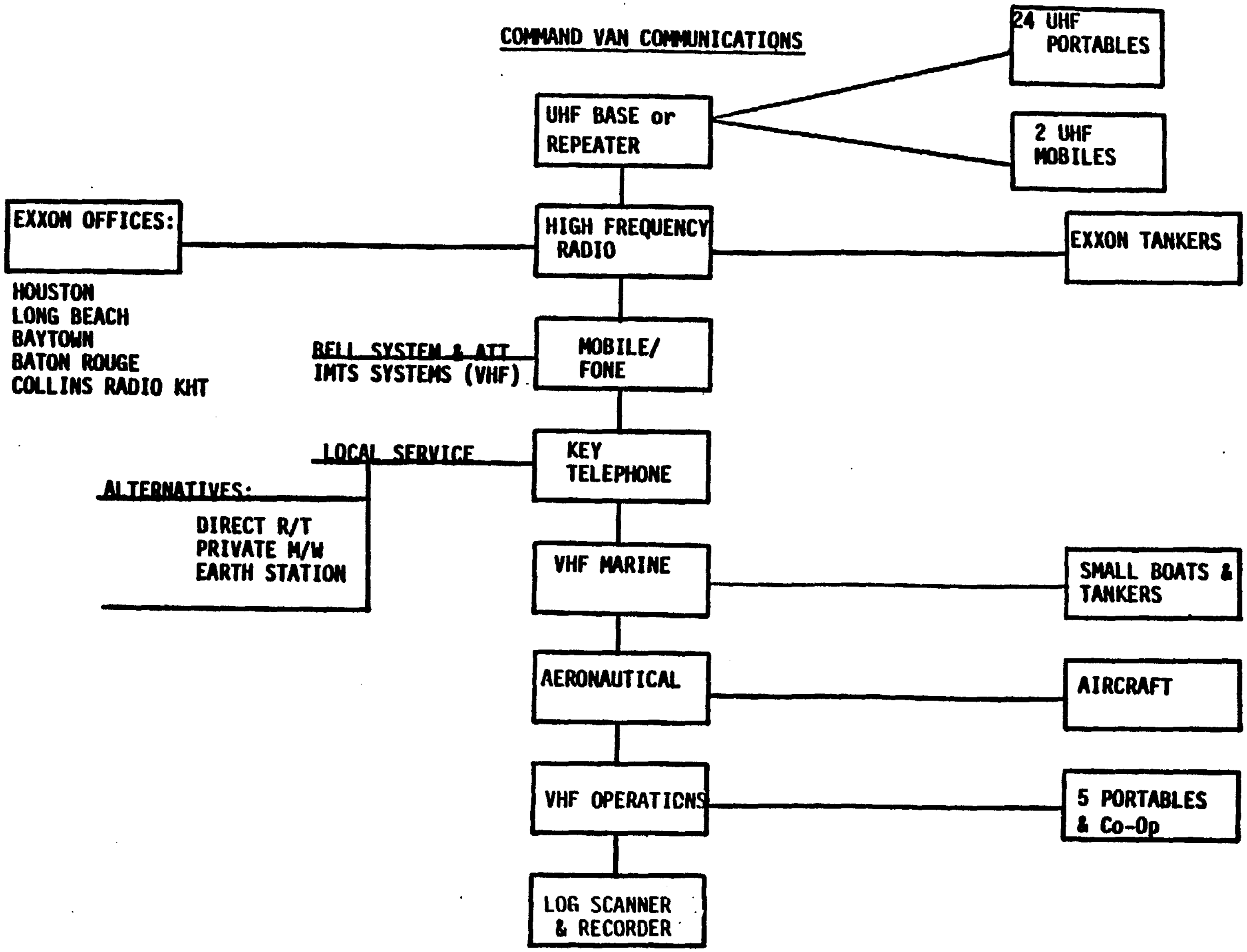
VHF MARINE BASE &
AIRCRAFT BASE (OSR 9)
WEATHER STATION (OSR 17)
LORAN C (OSR 16)
SCANNER & RECORDER (OSR 10)
BALLOON & REPEATER (OSR 20 & 21)

MISC. EQUIPMENT W/ VAN, Fixed Antennas
Tools, Test Equipment, Cables etc.

FUNCTIONAL LAYOUT

EXXON OSR COMMUNICATIONS SYSTEM

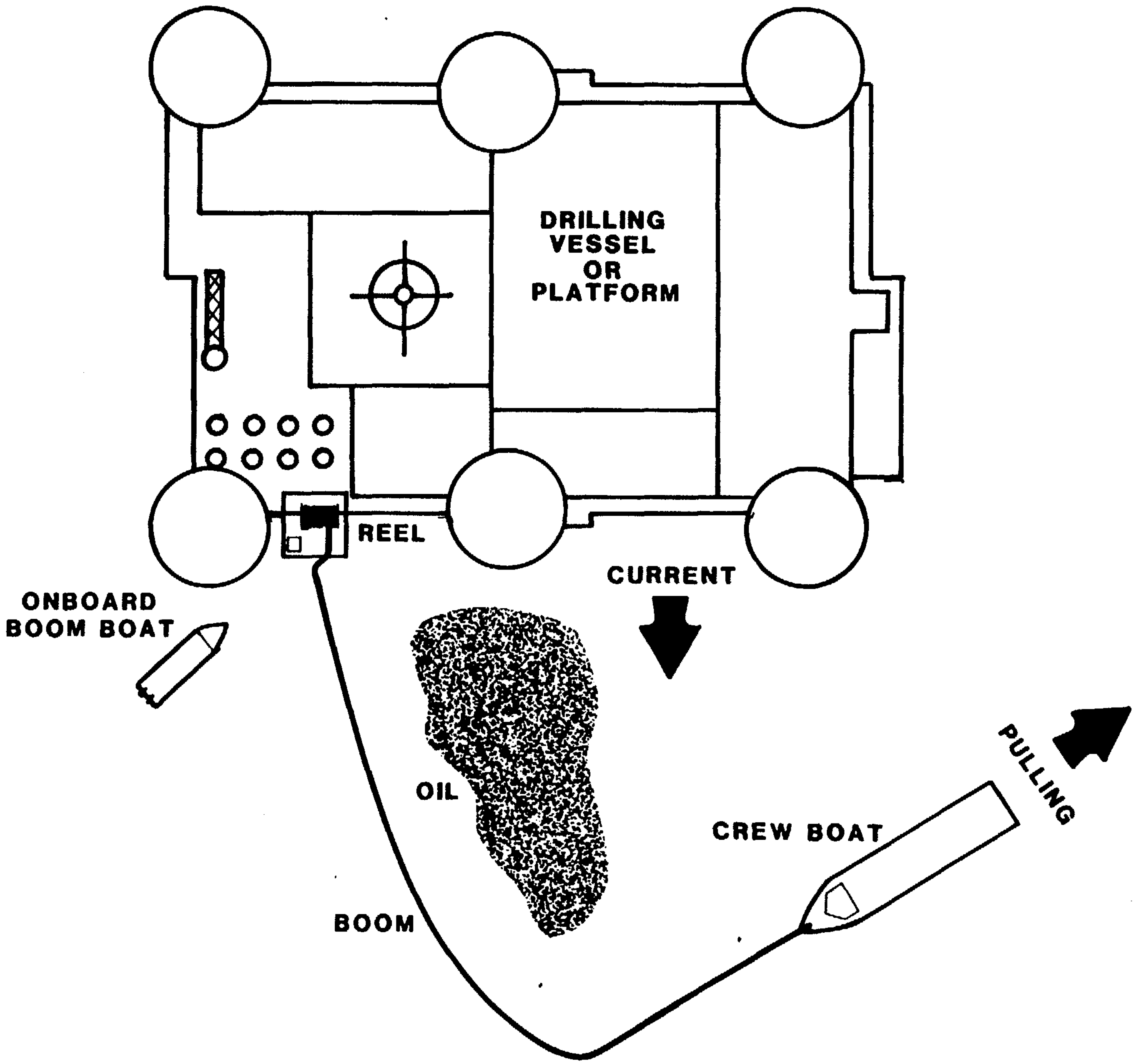
12/82



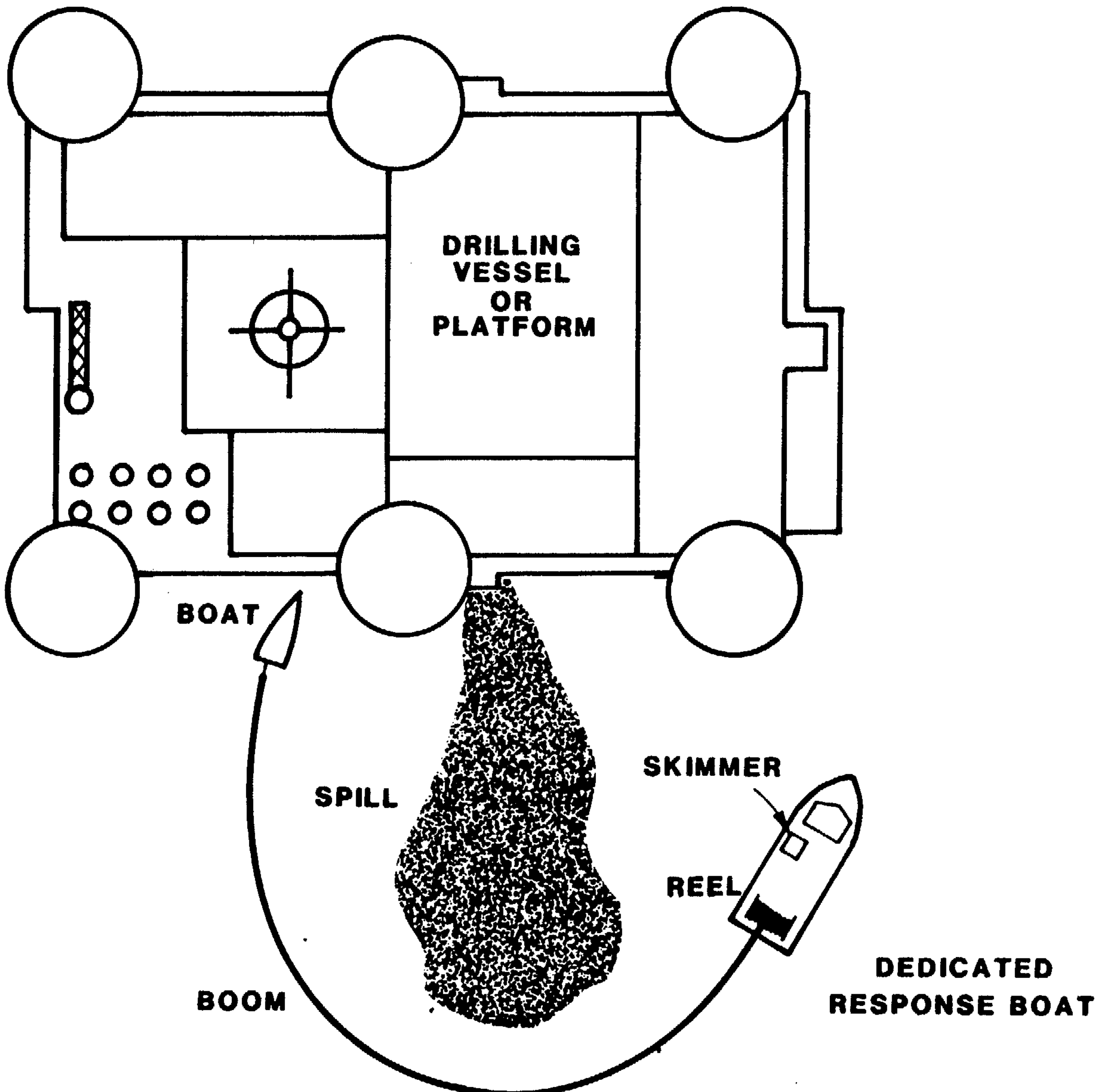
POINTS OF COMMUNICATION- OSR VAN SYSTEM

12/82

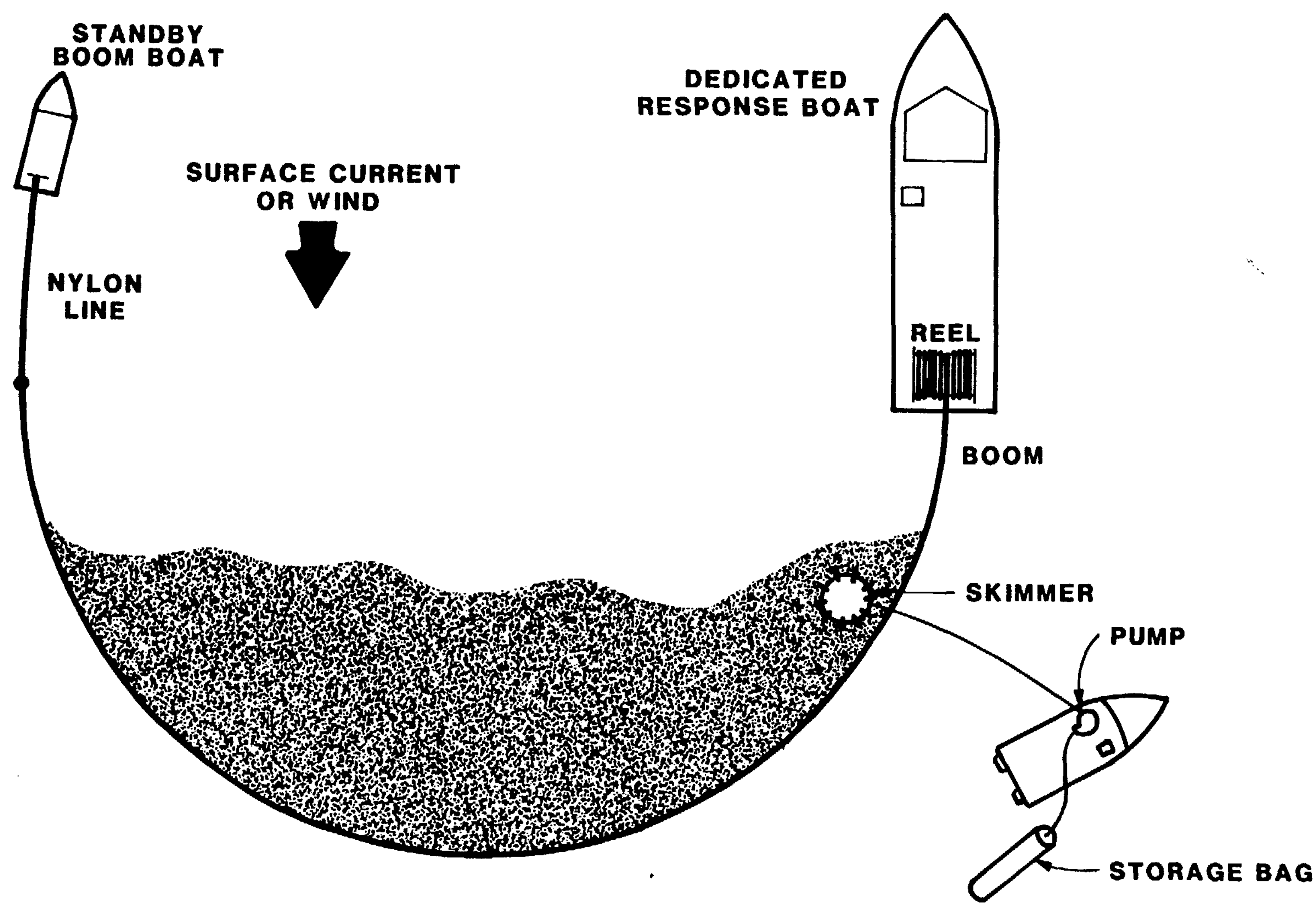
BOOM DEPLOYMENT METHOD



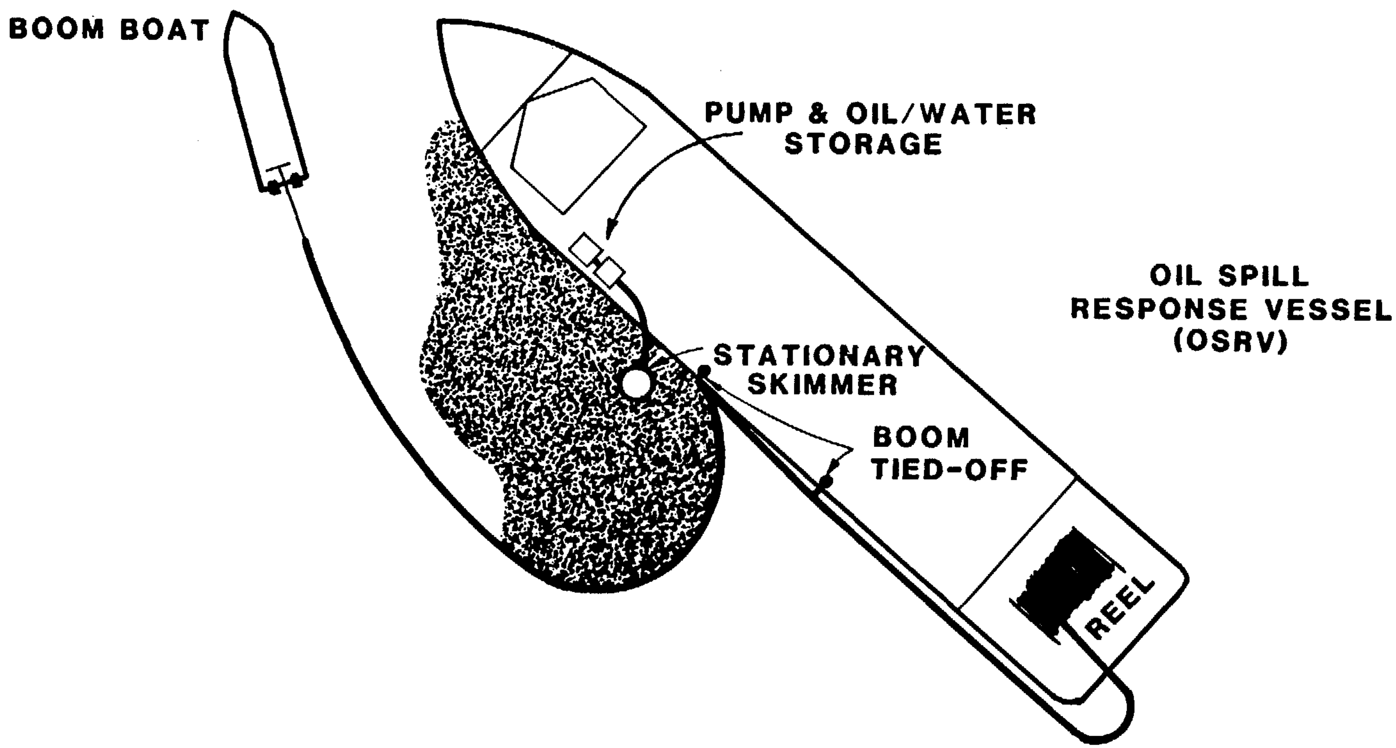
CONTAINING A CONTINUING SPILL AT A DRILLING VESSEL (SEMISUBMERSIBLE OR PLATFORM)



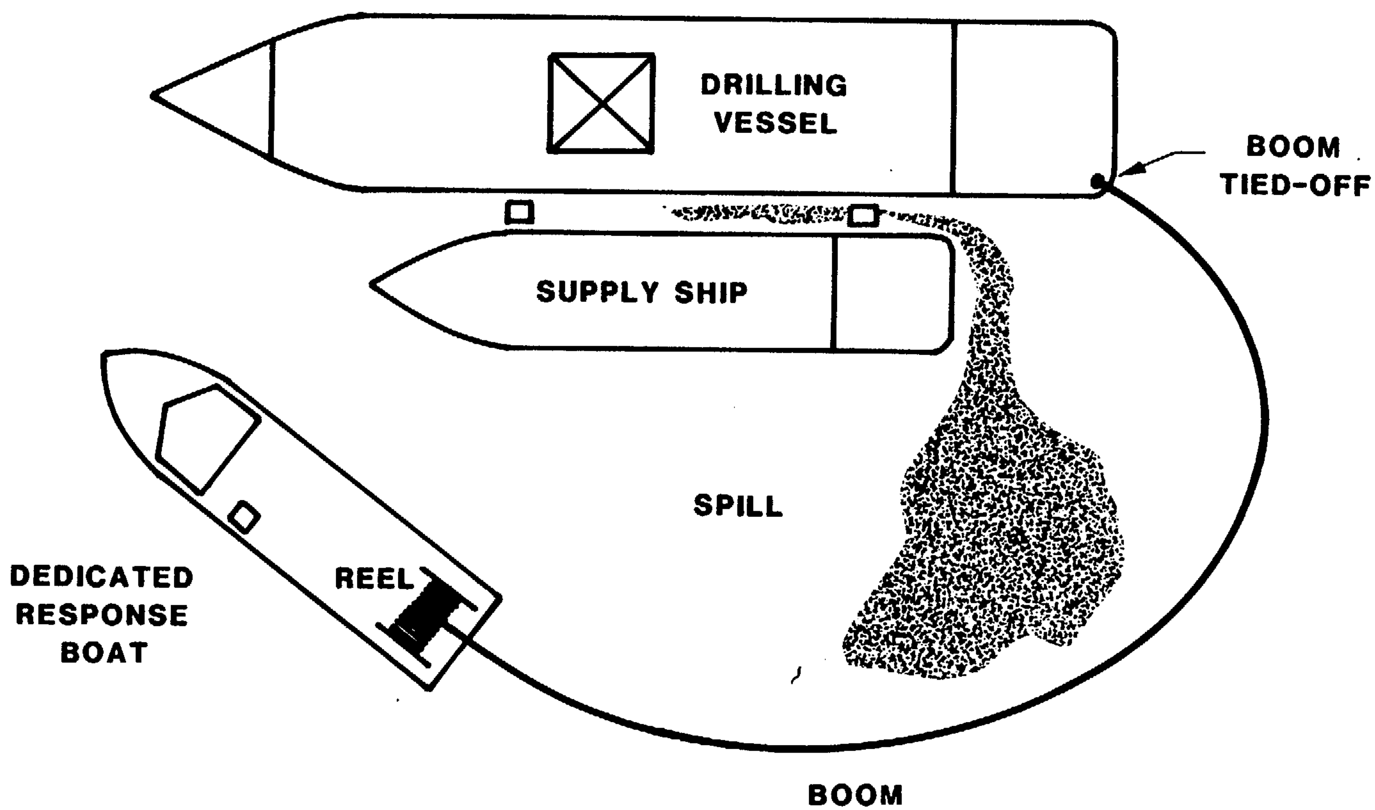
CONTAINMENT : OPEN WATER



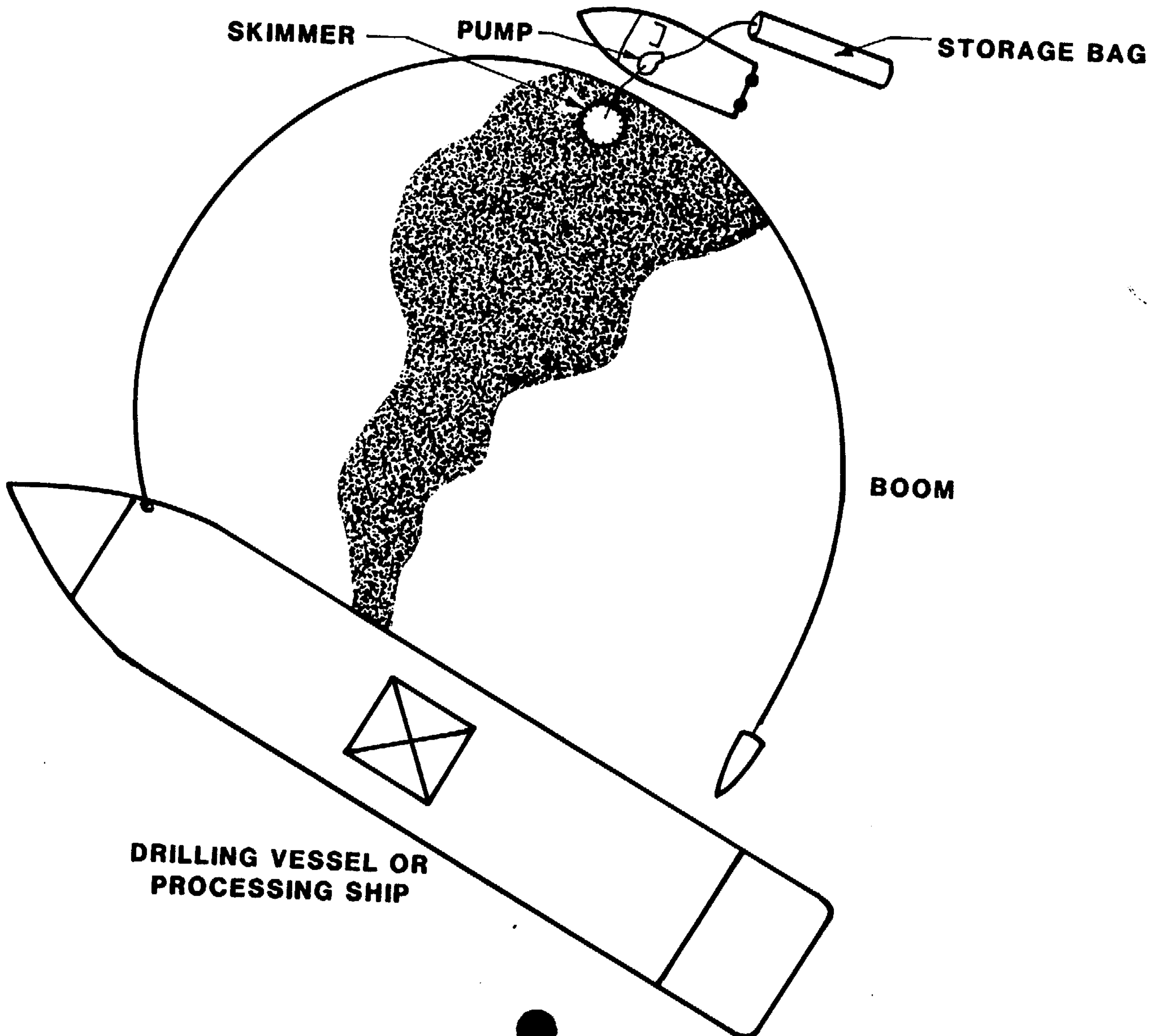
CLEANUP OF CONTAINED OIL SPILL



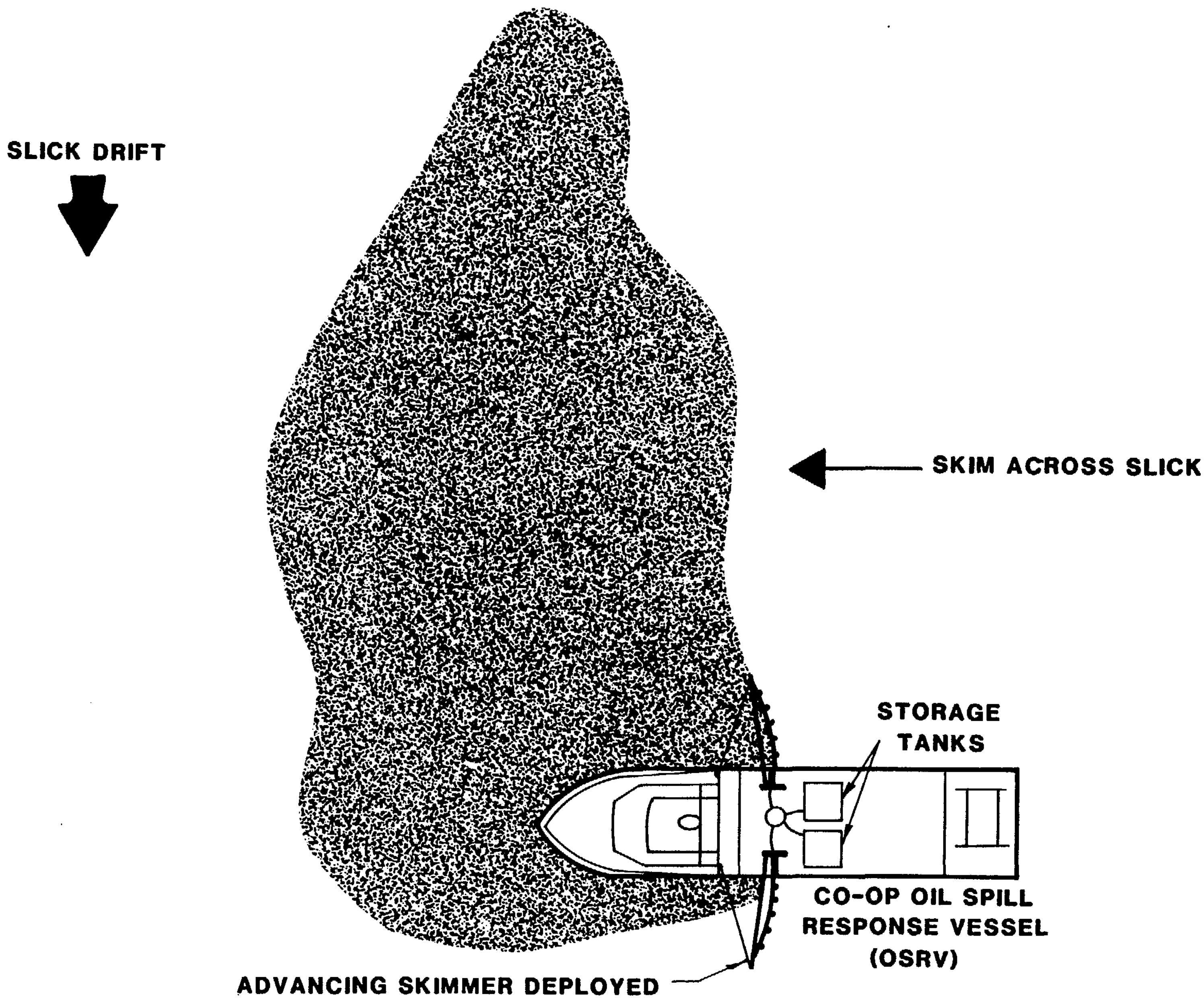
CONTAINMENT : FUEL OIL TRANSFER



DRILLING SHIP OR PROCESSING VESSEL CONTAINMENT



SKIMMING UNCONTAINED SPILL WITH ADVANCING TYPE SKIMMER



9. CHEMICAL DISPERSANT

EPA SCHEDULE 408, ANNEX X - REQUIRED DATA TO USE DISPERSANTS

(National Oil Spill Contingency Plan)

408 SCHEDULE OF CHEMICALS TO REMOVE OIL AND HAZARDOUS SUBSTANCES

408.1 The use of chemical agents for oil spill removal is discouraged in preference to mechanical means. The use of chemicals may be applicable under certain circumstances, as outlined in Annex X of the National Oil Spill Contingency Plan. Basically chemicals may be used anytime, anywhere at the discretion of the OSC to reduce the immediate hazards to life and property due to explosion and fire. Other situations will be evaluated by the senior EPA representative on scene on a case-by -case basis, in consultation with other appropriate State/Federal representative. A list of acceptable removal agents is found in Annex X of this Plan.

408.2 The method of evaluation for use of dispersants on oil spill is based on compilation of data to provide the most accurate picture of the situation on-scene. To facilitate the decision process, a dispersant use form was developed by a committee of RRT members for use by the Federal on-scene coordinator. This form requires information that must be provided prior to the RRT rendering a decision.

4OS.2-1 DISPERSANT USE FORM COMPLIATION OF DATA

1. Spill data

   a. Circumstances (Fire, grounding, collision, etc.)

   b. Time/Date of Incident

   c. Location of spill (Latitude, Longitude, river mile, etc.)

   d. Location of area to be sprayed and size

   e. Volume of substance released

   f. Total potential of release

   g. Type of release (instantaneous, continuous, intermittent, etc.)

   h. Is the source expected to continue to discharge?

2. Characteristics of the released substance (USCG, OSC)

   a. Specific gravity:

   b. Viscosity

   c. Pour Point

   d. Solubility

   e. Volatility - (Flash point)

   f. Sulphur content (sour crude, etc.)

   g. Susceptibility to mousse formation or to nature dispersion

   h. Relative Toxicity (High, medium, low)

3. Weather and Water Condition/Forecasts (include information for approximated time of treatment) (NOAA)

   a. Air temperature, wind speed, and direction:

   b. Tide and Current information (direction, velocity, range, stage)

   c. Wave height and frequency

   d. Water depth and depth of mixed layer

e. Flushing characteristics (turnover time)

f. Estuarine circulation (Fresh water circulation)

4. Oil Trajectory Information (NOAA) Evaluation of Probable Fate of Oil: What will be the fate of the oil if nothing is done?

a. 48-hour surface oil trajectory forecast:

1. Surface area of slick

2. Expected areas of land fall

b. 48-hour dispersed oil trajectory forecast:

1. Oil movement in water column

2. Surface oil movement and expected land fall

5. Characteristics of available dispersants and application equipment.

a. Characteristics of the dispersants: (USCG, OSC)

	Product One	Product Two	Product Three
1. name			
2. manufacturer			
3. when available			
4. location(s)			
5. amount available			
6. type of containers			
7. characteristics			
(a) toxicity			
(b) reactions			
(c) applicability to spilled oil			
(d) other			
8. application methods			

408.2-1(cont'd)

b. Type of transportation and dispersing equipment:

	Company One	Company Two	Company Three
1. name			
2. location			
3. time to arrive			
4. equipment available			
5. other			

6. Information about available dispersant and dispersing equipment.

a. Name of the proposed dispersant on EPA acceptance list: (USCG, EPA)

b. Type (self-mix, concentrate, etc)

c. Proposed application methods and rates

d. Efficiency under existing conditions (% dispersed and volume dispersed)

e. Schedule of dispersing operation

f. Location of the area to be treated

g. Surface area of the slick which can be treated in the scheduled ti[me] period

7. Conventional methods and time considerations for containment and cleanup feasible and available.

	Dispersant treated spill	(USCG) (OSC) Untreated spill
a. Containment at the source		
b. Shoreline protection strategies		
c. Shoreline cleanup strategies		
d. Time necessary to execute response		

8. Habitats and resources at risk: (Resource Agencies)

	Dispersant treated spill	Untreated spill
a. Shoreline habitat type and area of impact		
1.		
2.		
3.		
4.		
b. Resources *		
1. endangered/threatened species		
2. marine mammals (pupping, migration)		
3. waterfowl use (nesting, migration)		
4. shellfish (spawning, harvesting)		
5. finfish (spawning, release migration, harvest)		
6. commerical use (aquaculture, water intakes, etc)		
7. public use areas (parks, marinas,etc)		
8. other resources of special significance		

* indicates seasonal considerations

9. Economic Considerations

   a. Cost of the dispersant operation

   b. Cost of conventional containment and protection

      1. with dispersant use

      2. without dispersant use

   c. Cost of shoreline cleanup (cost per barrel x number of barrels reaching shoreline)

      1. with dispersant use

      2. without dispersant use

10. Recommendation to the RRT

a. Do not use dispersants

b. Use dispersants on a trial basis, but not as a control or cleanup technique.

c. Disperse in limited or selected areas

d. Disperse to the maximum extent possible with accepted methods and available equipment

11. RRT Evaluation of the consequences of a dispersant application decision.

a. Will application of dispersant remove a significant amount of the slick from surface water?

b. Can the extent or location of shoreline impacts be altered in a positive manner?

c. Can the damage to endangered or threatened species, marine mammals, and waterfowl be lessened?

d. Will the damage to habitats and resources resulting from chemical dispersion be less than those resulting without chemical dispersion?

e. If recreational, economic and aesthetic considerations are a higher priority than natural resource consideration, what is the most effective means of their protection?

Dispersant Checklist Flow Chart

Spill Date (B-1)
(OSC)

Characteristics of the Oil (B-2)
(OSC)

Characteristics of Available Dispersants (B-5) (OSC)

Method of Dispersant Use (B-6) (OSC)

Conventional Response Methods (B-7) (OSC)

Weather/Water Conditions (B-3)
(SSC)

Oil Trajectory Information (B-4)
(SSC)

Habitat and Resources at Risk (B-8) (SSC)

Economic Considerations (B-9)
(OSC)

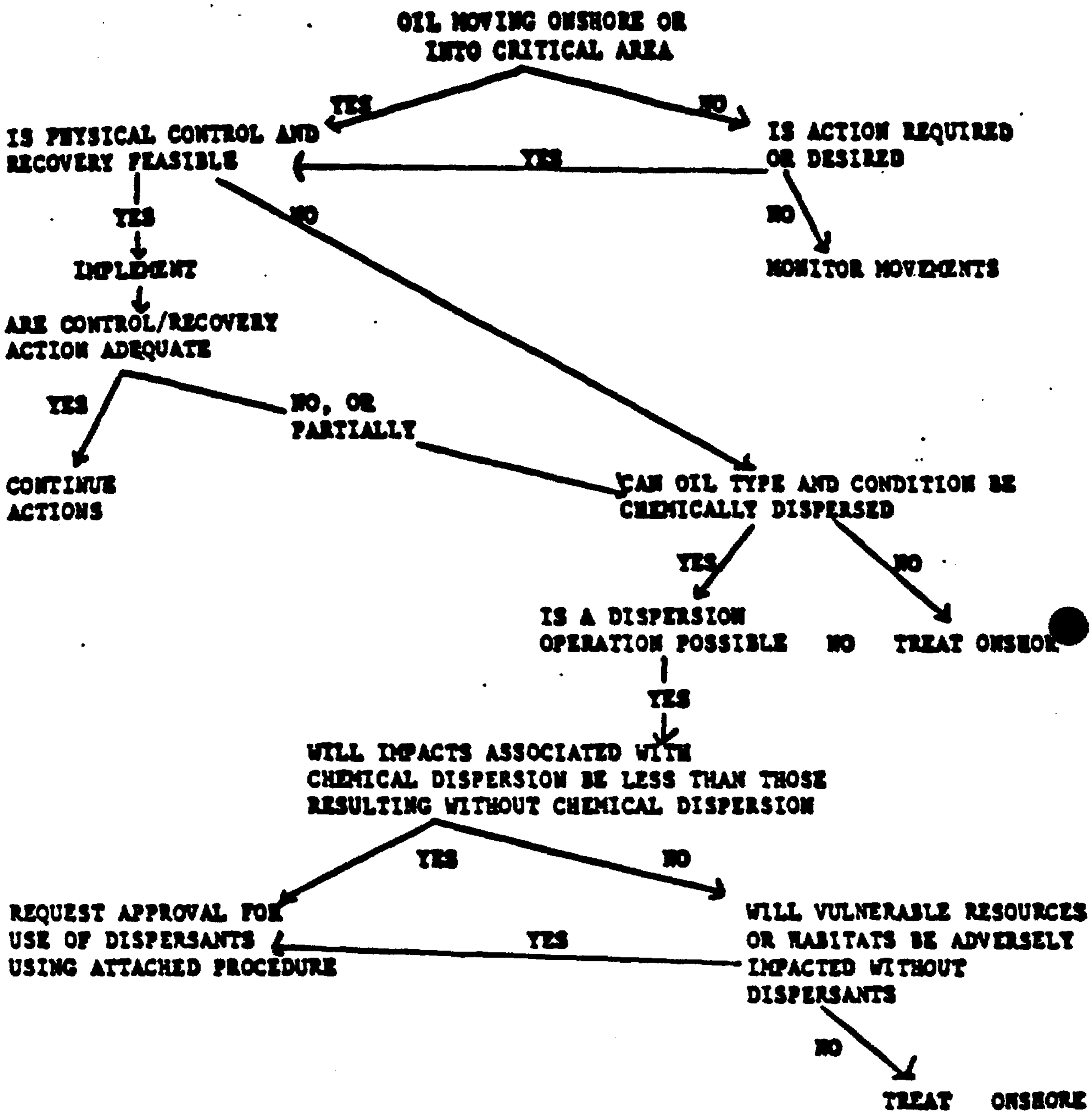
Recommendations to the RRT (D)
(OSC)

Evaluation of Consequences (C)

(RRT)

The following steps should be utilized in deciding if the use of dispersants will be requested.

NOTE: Immediate threat to life and property pre-empt the following matrix by the OSC in the use of dispersants.



PREPLANNING FOR CHEMICAL DISPERSANT USE

The scope of dispersant preplanning use is to provide the On-Scene-Commander (OSC) with as much available information as required by Annex X of the National Oil Spill Contingency Plan as can be furnished before an actual spill incident. Available preplanning data that is required and can be furnished to the OSC are: characteristics of the spilled oil and the dispersant to be used, the availability of dispersants, method of dispersant application, spill trajectory analyses from average monthly data, risk analyses, and location of biological sensitive areas that may be impacted by the spill. Also, locations of fixed facilities can be furnished in advance. Other data required by the OSC can only be furnished after the spill occurrence, and they are: the time of the spill, the weather and sea conditions, the volume of oil spilled, effectiveness of mechanical control, threatened life or property, economic considerations and the evaluation of the consequences.

The information required for preplanned dispersant use is included in this plan on the following pages:

- Characteristics of the dispersant to be used, page 900-22.
- Availability of the preplanned dispersant, page 900-21.
- Spreading characteristic of Monterey crude, pages 900-25 & 26.
- Dispersant application, Method and Tables, pages 900-27-37.
- Trajectory Modeling, Section 11.
- Risk Analyses, Section 10.
- Biological sensitive areas, Section 6.
- Postulated spill volumes, time, radius, and size of areas of specific regimes for Monterey crude, page 900-26.

GUIDE FOR REQUEST TO USE DISPERSANT ON OIL SPILL

Contact and furnish information to: OSC (USCG - 213/590-2315)

1. Spill Data:

a. Cause of Spill ____________________

b. Time of occurrence __________ Date __________

c. Geographic Location: Lat. __________ Long. __________

d. Location of slick and area size (acres, sq. mi., etc.), direction moving:

Approx. Center: Lat. __________ Long. __________

Area: __________ Direction: __________

e. Volume of oil released: Bbl __________ Gal __________

f. Type of oil released: Crude Name __________

g. Release: Instantaneous _____ Continuous _____

Intermittant _____

h. Will source continue to discharge? Yes _____ No _____

i. If continuous, estimate time: Mos. _____ Weeks _____

Hrs. _____

2. Characteristics of Released Substance:

a. Specific Gravity (API): _____ b. Viscosity: _____

c. Pour Point: __________ d. Solubility: _____

e. Volatility (Flash Point) __________ f. Sulfur Content: % _____ ppm _____

g. Susceptible to Mousse __________ Natural Dispersion __________

h. Relative Toxicity: High _____ Medium _____ Low _____

3. Characteristics of Available Dispersant:

a. Name: COREXIT-9527 b. Manufacturer: Exxon Chemical

c. Toxicity: Low Dosage Rate: Gal/Ac. 2-5, D/O 1:30

d. Effectiveness: Good Applicable to Spilled Oil: Good (Self-mixing concentrate or diluted)

e. Amount available locally: 21,780 Gal. Within 24 hrs: 55,000 Gal. (Continuous supply within one week)

f. Application Methods: Weather & sea permitting by boat, by aircraft if weather & sea excess or very large spill

g. Aircraft Available: Globe Air/DC-4, 4 hours, boats immediate. Additional Aircraft: Local helicopters adapted with bucket & spray booms from Clean Seas/2 to 4 hrs

4. Weather and Sea Conditions/Current and Forecasts:

a. Air Temperature: ______ °F Wind Speed _______ mph/knts

Wind direction from: ____________

b. Sea Condition: Temp. _____ °F Wave Height: ________ ft.

Frequency: ___________ min. Water Depth: _________ ft.

Current Speed: __________ knots Direction: __________

c. Tidal Information: High ____ Low ____ Stage: Flood ____

Ebb _____ Slack _____.

(Information required at time of spill and corrected to time of dispersant use, if approval received.).

5. Characteristics of Shoreline of Potential Impact*

a. General Description: Rocky ____ Sandy Beach ____ Bluffs ____ or cliffs ____.

b. Biological Sensitivity: Marine mammals ____ haulout ____ rookeries ____ endangered species ____.
Birds: Endangered species ____ nesting area ____.
Shellfish: Spawning ____ harvesting ____ .
Finfish: Spawning ____ migration ____ harvest ____.

c. Other Resources: Public use ____ commercial use ____ parks ____ marinas ____.

d. Accessibility for cleanup: Roads ____ private prop. ____ use heavy equipment ____ hand work only ____.

* To obtain the shoreline information, locate potential shoreline impact area from shoreline maps in Section C. Review the descriptions in Section C of this Addendum and contact the California Department of Fish & Game if additional wildlife and fish information is required, (213) 590-5163 or (805) 772-1261.

6. Trajectory Information, Potential Shoreline Impact

a. Use trajectory models in Section B for month of spill occurrence. If conditions apply, use model. If conditions are different, trajectories will have to be calculated. Use vector addition analysis as outlined in Section B. Weather permitting, use aircraft for surveillance.

b. Surface area of slick, 48 hours: use Tables F-9-1 & 2 for projection if spill is Monterey or Sandstone or similar gravity crude. Weather permitting, observe from aircraft.

1. Use response guides for containment and cleanup as outlined in Section D. Advise Co-op to mobilize equipment.

2. Weather permitting, observe oil movement in water column from boat.

7. Identify and Advise OSC of Potential Threat to Marine Life, Waterfowl and Public and Commercial Use Areas

8. Review Economic and Social Considerations With and Without Dispersant

a. Furnish conclusion of review to OSC.

9. OSC Will Evaluate Consequences

DISPERSION AIDED BY CHEMICAL DISPERSANT

Oil on the ocean surface is naturally broken up by the motion of waves. This process (called dispersion) is rather slow, and a slick can travel long distances before breakup is complete. The pieces formed during natural dispersion are usually rather large masses and are commonly composed of a water-in-oil emulsion, and often assume the form of a "tar ball" mousse.

COREXIT chemical dispersants aid this natural process by reducing the oil/water interfacial tension, thereby making it easier for the sea to break up the oil slick. Very small oil droplets are formed, and complete dispersion is possible in a matter of minutes. In other words, chemical dispersants function to aid the environment to do what will eventually occur without treatment, but to do it much faster.

The emphasis, however, is on the use of chemicals to aid the environment, which means using the least amount of chemicals needed to initiate the dispersion process. Overtreatment may result in the oil becoming invisible faster, but it is better to use less chemical and allow the sea time to finish the dispersion process.

Dispersant formulations contain surface-active agents (surfactants). Each surfactant molecule has a water-soluble and an oil-soluble end. After contacting an oil slick on water, these molecules diffuse through the oil to the oil/water interface under the slick. This is why dispersant chemicals must be applied directly to the oil slick. Application to the water around the slick will have no effect and is thus misusing and wasting the chemical.

Dispersants are best applied in droplets rather than a fine spray. The droplets aid in rapid penetration of the oil by the active surfactants, which are only effective when properly oriented at the oil/water interface. The oil droplets are prevented from recoalescing because they are repelled by the surrounding water-soluble ends of the surfactant. The normal motion of the sea (wind and waves) or a workboat's wake usually provides adequate action for the rapid movement of oil droplets with attached dispersant molecules away from the slick. The droplets rapidly become diluted in the water as they leave the spill site.

As the molecules of oil/dispersant spreads, it does not have a tendency to sink and generally remain at or very near the water's surface. These molecules will not adhere to birds, boats, or shorelines. In the dispersed form, the spilled oil increases to a much larger surface area. Therefore, the rates of solution, evaporation, oxidation and biodegradation are greatly increased.

Since most dispersant use is on water with reasonable wave action, requirement for external "mixing energy" input should be minimal. Dispersants are not generally used on spills on calm water; if they are, mechanical mixing or agitating equipment may be necessary. Excessive mixing, however, may lead to a need for an increased amount of chemical.

There are three basic types of dispersant formulations. These are water-based products, hydrocarbon-solvent-based products and concentrates having a minimum of diluent. They differ in activity in terms of the ease with which dispersed droplets are formed. Water-based products may require more time or more energy input to effect complete dispersion. Solvent-based products, which are used primarily to disperse waxy or heavy oils, cause dispersion to occur somewhat more easily, but require much higher dosages. Concentrates, especially the self-mix type, break the oil into extremely fine droplets and require minimal energy input. All of these actions are to some extent dependent on the oil treated, the method of application used and the result desired. It is important to know the nature of the dispersant formulation because it determines, at least in part, the application procedures required and the amount of product necessary.

The most active of the COREXIT oil dispersants - COREXIT 9527 Dispersant Concentrate - should be stocked if circumstances prevent a full range of products from being stocked. Since it is essentially a self-energizing dispersant, COREXIT 9527 requires little or no additional mixing energy when applied to oil in salt water. Because of this high degree of activity and the fact that much less of it is generally required to treat all types of spills, storage requirements and material costs are minimized with COREXIT 9527. Although COREXIT 9527 is a concentrate, it may be diluted to 10 to 15% in fresh water or a low toxicity solvent such as kerosene or other aliphatic solvents, depending on the application method. If applied by hand sprayer or a boat with spraying booms, it is normally diluted. If applied by aerial spray, COREXIT 9527 should be applied in full strength.

FATE AND EFFECT OF CHEMICALLY TREATED OIL

Although mechanical containment and cleanup are the preferred method of oil spill control, chemical dispersants can be invaluable to reduce the immediate hazard to life, property and to lessen the amount of damage to the environment.

Several years ago, dispersants on the commercial market were only moderately effective and were relatively toxic. Their low effectiveness meant they had to be applied by surface vessels which provided additional mixing energy to the oil/dispersant layer on the water by the use of mixing devices such as breaker boards.

Within the last few years, chemical manufacturers have developed more powerful, less toxic products which are sufficiently effective for many oil spills that only the mixing provided by natural ocean turbulence is required for dispersion to occur. This has allowed the chemicals to be applied via aircraft resulting in the potential for more rapid treatment of larger oil slicks than was possible with the use of surface application methods. The state-of-the-art has developed so that this technique is now considered an important option for dealing with large marine oil spills. In fact, dispersants were used extensively in this fashion to treat the world's largest oil spill, the Ixtoc I blowout in the Gulf of Mexico (Lindblom et.al., 1981). In June 1979, the Pemex IXTOC blowout in the Bay of Campeche released 30,000 barrels of oil per day. The Mexican government contracted a four-engine aircraft from Conair Corporation and sprayed over one million gallons of COREXIT 9527 along the landward edge of the slick. The COREXIT 9527 was applied to the oil slick during a six month period and was credited with preventing oil contamination of Mexican beaches.

In addition to visual evidence of the dispersants' effectiveness on fresh crude, in September 1979, a field test was conducted on weathered oil from the IXTOC blowout. COREXIT 9527 effectively dispersed the weathered oil into the top 10 feet of water.

Preliminary findings in scientific tests conducted by Mexican authorities, indicated little or no short term measurable impact on the marine life in the area surveyed. Studies are still being conducted to determine if there are any observable long term impacts.

In order to determine the dilution rate of chemically dispersed oil at sea, two ocean dumping permits were obtained in the U.S. by the API. These research spills, funded by both government and industry, were meant to quantify the fate and effects of using dispersants in the real world. The program consisted of research spills which were conducted off Southern California and off New Jersey during 1978 and 1979. Both employed COREXIT 9527. Extensive and valuable data were obtained from both spills, which will be an aid to defining the role that dispersants could play.

The tests conducted in 1978 and 1979 off Southern California showed the importance of proper application technique. In 1978 the aerial application produced too fine a spray and the delivery of the chemical to the research oil spill was limited. However, some level of dispersion did occur and indicated that most of the dispersed oil stayed in the upper meter of the water column and oil concentration levels were under 10 ppm. In 1979 the aerial application was improved with larger droplets delivered to the oil slick resulting in a greater degree of dispersal.

Biological samples indicated no significant mortalities in plankton or fish.

Tests off New Jersey in November 1978 resulted in a complete dispersion of the research spill and oil movement in the water column down to 9 meters was monitored for 2-1/2 hours after the spill. After that time, the entire zone had returned to background oil levels. These results were duplicated in a repeat series of tests in October 1979.

RESULTS OF TEST CONDUCTED ON MONTEREY CRUDE WITH COREXIT 9527

In June of 1980, Dr. G.P. Lindblom of Exxon Chemical Company conducted laboratory tests on Monterey crude, 16^{o}API gravity from the South Ellwood Field. This crude is very similar to the Monterey crude produced from our Hondo field. The results of his laboratory tests showed that COREXIT 9527 concentrate was very active in reducing oil/water interfacial tension of Monterey crude when natural or mechanical energy is applied. The laboratory tests showed that dispersant chemicals themselves do not disperse oil; rather, they reduce the strength of the oil film so that it becomes easily dispersible when the movement of the water causes the dispersion of oil droplets from the treated slick. He hypothesized that the dispersion rate would be even faster on an oil slick in an active sea.

Several dispersants to oil ratios (D/O) were tested with seawater at 58^{o}F and 78^{o}F. Ratios of 1:25 and 1:30 D/O effectively dispersed the Monterey crude at 58^{o}F. The tests showed that a ratio of 1:40 was the minimum D/O that was effective on Monterey crude at 58^{o}F, which is about the average water temperature in the Santa Barbara Channel.

Dr. Lindblom concluded that the sample oil probably represents a "worst case" API gravity for this area of California oil and COREXIT 9527 concentrate is certainly the best available choice for a single stockpiled dispersant.

The full text of this laboratory report is included as an appendix to this section.

Oil, even in very thin slicks, is known to be harmful to birds, so the advantages of protecting them through the use of dispersants are clear. The effects of chemically dispersed oil on water column dwellers are less clear, but a picture of the effects of their use in deep, offshore waters is emerging from the research during recent years. The latest generation of dispersants are relatively non-toxic themselves, so the effects on water-column dwellers are due primarily to the dissolved and particulate oil (Mackay and Wells, 1981; Sprague et.al., 1981; Trudel, 1978). When dispersants are applied, the resultant concentration of oil in the water column is initially high (in the parts per million range) but these concentrations decrease quickly to low levels (in the parts per billion range), so that sub-lethal effects rapidly become the main biological concern.

The following three studies are pertinent because, prior to them, scientists had speculated publicly that oil could have serious detrimental effects on marine life. Since dispersants would make the oil more available to marine life, it was thought that dispersants would increase any damage that might be caused by oil, which was alleged to be a highly toxic substance. Following are summaries of the three studies.

- "Laboratory Studies on the Clinical Effects of Oil on Marine Organisms" by Dr. J. W. Anderson indicated that hydrocarbon uptake in tissue (from oil-water dispersion) was readily depurated from clams and oysters when the animals were returned to clean water. Although naphthalenes (possibly responsible for a major portion of the toxicity of refined oils) were most readily taken up by the test specimens, they released this compound to the levels in comparable control animals after approcimately ten days.

- Several important observations emanating from a "Survey of Substantial Effects of Chronic Exposure to Oil" by Dr. Dale Straughan are:

  - At Coal Oil Point (California) the total extractable hydrocarbon in sediment from the natural seep area is as high as 90,000 ppm; this compares to a "background" level of 11 to 92 ppm at control sites. Despite this high sediment hydrocarbon content, the maximum water column hydrocarbon content is a remarkably low 0.5 ppm.

  - Petroleum hydrocarbons found in either the abalone or lobster were in either the viscera or gonads. No effect on the life cycle was found. No petroleum hydrocarbons were found in the muscle tissue - the edible part of the species - in either the abalone or lobster.

- Marine life, such as sea urchins, were observed to be living at Coal Oil Point in close proximity to actual points of oil seepage with no apparent stress. Of most significance was the fact that no abnormalities in marine life could be found at Coal Oil Point.

• A Battelle Northwest Laboratories project, "Effects of Oil Discharges on the Fisheries of Lake Maracaibo" was sponsored by Creole. Samples of commercially important fish were examined for hydrocarbon content to determine if petroleum hydrocarbons were accumulated in the tissues of Lake Maracaibo fish. The data show that there is little evidence of petroleum hydrocarbon accumulation and that the saturated hydrocarbons found in the test specimens are similar to those compounds naturally occurring in plants. No naphthalenes, indicators of oil contamination, were found in any of the samples analyzed.

CHEMICAL DISPERSANT CHARACTERISTICS

"COREXIT 9527"/Manufactured by Exxon Chemical Americas

- Low Toxicity
- Self-mixing, concentrated product (non-solvent base)
- Very efficient dispersion of oil in salt water
- May be used full strength or diluted
- Recommended dosage - 2 to 5 gal/acre
- May be applied by hand spray unit or boats and aircraft with application equipment
- Availability of Corexit 9527 to Exxon, Western Division
    - Local, Clean Seas 2-100 drum tank trailers, 55 drums stored in their Carpinteria yard, also 5 drums each on Mr. Clean and Mr. Clean II. Exxon has 2 drums on each OCS facility (6 drums). Clean Coastal Waters has 100 drums stored in the Long Beach Harbor area. Exxon Chemical stocks 25 drums in the Los Angeles Harbor area and can provide 1000 drums within 24 hours from Texas. Exxon Chemical can also provide over 600 drums per week if required.

Toxicity (Laboratory testing results, Dr. G. P. Lindblom/Exxon Chem.)

• Zebra fish	48 hours	LC 50	550 ppm
• Fathead minnows	48 hours	LC 50	320 ppm
• Mummichog (Fandulas)	48 hours	LC 50	116 ppm
• Brine shrimp (Artemia)	48 hours	LC 50	130 ppm

- Brown shrimp (crangon crangon) passes MAFF test, U.K.

(Actual amount (ppm) in water for 5-10 gpa dosage is far below any value given.)

EPA Accepted Corexit 9527 satisfies the requirements as prescribed for dispersing agents in 2003.3-4, Annex X.

CHARACTERISTICS OF COREXIT 9527

Specific Gravity, @ $60^{o}F/15.6^{o}C$	1.01
Density, Lb/Gal @ $60^{o}F/15.6^{o}C$	8.43
Flash Point, SETA CC, $^{o}F/^{o}C$	175/79.4
Pour Point, $^{o}F/^{o}C$	-321/-35

Viscosities

cSt @ $60^{o}F/15.6^{o}C$	67
cSt @ $100^{o}F/37.7^{o}C$	25
cSt @ $150^{o}F/65.6^{o}C$	10
SUS @ $100^{o}F/37.7^{o}C$	118

Solubility

Soluble in fresh water and in hydrocarbon solvents. Dispersible in salt water.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

10 MAR 1978

OFFICE OF WATER AND HAZARDOUS MATERIALS

Mr. Gordon P. Lindblom
Exxon Chemical Company
8230 Stedman Street
Houston, Texas 77029

Dear Mr. Lindblom:

You are hereby notified that the technical product data submission on "COREXIT 9527" oil dispersant has been accepted by the Environmental Protection Agency (EPA). The furnished product data were reviewed and satisfy the requirements for dispersing agent testing as prescribed in Paragraph 2003.3-4 of Annex X of the National Oil and Hazardous Substances Pollution Contingency Plan. In accordance with Annex X, the technical product data will be maintained on file by the Oil and Special Materials Control Division, and the on-scene coordinator can authorize use of the dispersing agent for spills of oil and hazardous substances on a case-by-case basis. Acceptance of technical product data by the Environmental Protection Agency does not constitute approval of the dispersing agent or imply compliance with any criteria or minimum standards for such agents.

As stated in Paragraph 2003.1, Authorization for use of dispersing agents, these agents may be used only when their use will: (1) prevent or substantially reduce hazard to human life or limb or substantially reduce explosion or fire hazard to property, (2) prevent or reduce substantial hazard to vulnerable species of waterfowl, and (3) result in the least overall environmental damage, or interference with designated water uses.

To avoid any possible misinterpretation or misrepresentation, this letter of acceptance may be reproduced only in its entirety in any advertisement or technical literature on the dispersing agent. Failure to comply with restrictions in Annex X or an improper reference to EPA in an attempt to demonstrate approval of the dispersing agent will constitute grounds for withdrawal of the letter of acceptance. Any change in the composition or formulation of the dispersing agent, affecting data submitted under Paragraph 2003.3-4, will require retesting of such agent before acceptance is reissued.

Sincerely yours,

Kenneth E. Biglane
Director, Oil and Special
Materials Control Division (WH-548)

SPREADING REGIMES OF MONTEREY CRUDE

The following spreading regime tables are for preplanning purposes in the event of a spill. They are for field use and for the potential use of dispersant. The volumes spilled are selected to use as an estimating guide for a spill of similar quantity. The tables will provide the field with a graphic source to estimate the time, spread radius and area in acres. These values can be used to estimate the amount of spill boom required to contain a similar size spill, and how much elapsed time would be available to contain it with a given amount of boom. If the slick could not be contained by mechanical means, then the volume and/or area of the slick could be used to determine the type of application (boat or aircraft) and the amount of dispersant required.

Section F.10 on application techniques and dosage rate tables requires the volume or area of spilled oil in acres to calculate the gallons of dispersant required. Therefore, these tables will be useful tools in making that decision. For example, the recommended dosage ratio for Monterey crude is 1:30 with 1:40 being the minimum dosage rate. That is, one part dispersant to 30 parts of oil to effectively disperse the oil. At a ratio of 1:40 in the laboratory tests, the oil started to show resuspension before five minutes.

SPREADING REGIMES
FOR MONTEREY CRUDE*

VOLUME	FIRST PHASE			SECOND PHASE			FINAL PHASE		
Barrels	Elap. Time	Radius Feet	Area Acres	Elap. Time	Radius Feet	Area Acres	Elap. Time	Radius Feet	Area Acres
10	0:05	70	0.3	0:08	75	0.4	1:48	690	34
25	0:07	100	0.7	0:14	110	0.9	2:52	950	65
50	0:09	135	1.3	0:23	150	2.0	4:03	1280	118
100	0:12	180	2.0	0:36	215	3.0	6:44	1640	194
200	0:14	240	4.0	0:57	300	7.0	8:07	2135	328
500	0:20	350	9.0	1:45	480	16.0	12:50	3020	657
1000	0:25	470	16.0	2:47	675	33.0	18:08	3935	1117
5000	0:42	920	60.0	8:09	1510	165.0	40:34	7220	3760
10000	0:53	1230	110.0	12:56	2140	330.0	57:22	9185	6085

Spreading regimes calculated by Fay/Hann formula.
First Phase - Gravity Inertia/Gravity Viscous Transition
Second Phase - Gravity Viscous/Surface Tension - Viscous Transition
Final Phase - Spreading Ceases

Note: Numbers rounded off for ease of use.
Natural dispersion not included, this would reduce areas 25-30% in approximately 2 hours.

* 16^{o} API Gravity is assumed for this table.

COREXIT 9527 can be used with all types of application equipment and may be immediately adapted to meet local requirements in dispersing oil slicks. It is effective on a wide range of petroleum products, including viscous crudes and fuel oils. Depending on the type of oil, one part of COREXIT 9527 will usually treat 30 to 69 parts of oil. With particularly efficient application procedures, as much as 100 parts of oil have been treated.

As with any dispersant, COREXIT 9527 should be applied to the floating oil, not to the water around it. Best results are always obtained with dispersants if treatment is begun early.

In addition to selection of the most effective dispersant, the successful dispersion of an oil slick requires the availability and use of proper equipment and carefully planned application procedures.

COREXIT 9527 Oil Dispersant Concentrate is usually diluted before or during use, although it may be used as supplied under certain circumstances, such as in aerial spraying. If equipment for dilution during use is not available, pre-use dilution may be required.

The product is soluble in both fresh water and hydrocarbon solvents. It is not completely soluble in salt water. (This desirable property enhances its action as an oil dispersant at sea.) If salt-water dilutions are made long before use, active ingredients may concentrate near the bottom of the container, and agitation will be required during use. This does not occur during the eduction of the chemical into seawater.

Dilutions containing one part of the concentrate to as much as 10 to 20 parts of water are equal to or superior in effectiveness to conventional dispersant formulations. More concentrated solutions may be necessary for very heavy slicks.

If the oil to be treated is extremely viscous, a hydrocarbon solvent-based dispersant may be required for treatment. In such a case, COREXIT 9527 should be diluted in kerosene or other aliphatic solvents. A solvent exhibiting a low order of toxicity is always preferred. A highly effective hydrocarbon-based dispersant dispersant is formed with dilutions of 1 part of COREXIT 9527 to 5 parts or more of solvent. Hydrocarbon-based formulations made from COREXIT 9527 offer superior oil dispersing qualities. When these diluted formulations are applied to an oil slick, dispersion occurs rapidly with a minimum of mixing.

HAND-HELD EQUIPMENT

Small spills can often be treated by spraying COREXIT 9527 from hand-held insecticide-type pressure cans or from backpack sprayers. In this use, a dilution or COREXIT 9527 of about 10 to 15% in fresh water will usually suffice.

COREXIT 9527 is particularly adaptable to use with workboats equipped with spray booms mounted ahead of the bow wake or as far forward as possible. The concentrated nature of the chemical enables a boat to increase the amount of time it is able to spray by 10 to 30 times over the work period possible if conventional dispersants were being used.

Spray equipment on workboats must be designed to provide a diluted dispersant solution to the spray booms. This is best accomplished by use of an eductor with a metering adjustment to feed chemical into the seawaer stream produced by a pump operating at about 80 to 100 psi, with a total capacity of about 100 to 150 gpm. Alternatively, with low-volume, low-pressure pumps (with which eduction is not possible), the chemical can be fed to the water stream with a small metering pump.

The concentration of chemical required must be calculated from: the total pump capacity; the swath width covered by the booms employed; the speed of the boat; and (possibly) the thickness of the slick or the amount of oil to be treated over a given area. Excellent results have been obtained with use of concentrations from 2 to 10% of the total water volume being pumped.

For instance, a 2% eduction rate at 4 knots using high-pressure equipment may be quite adequate. With a low-volume pump, a 10% eduction rate may be required at the same boat speed. A treatment rate of about 5 U.S. gallons (USG) per acre is recommended for slicks of average thickness.

Unless land areas are immediately threatened, neither agitation nor chemical concentration should necessarily be increased simply to cause rapid disappearance of the oil.

Nozzles for spray booms should be carefully selected to give a uniform spray of droplets - not a fog or mist. This is necessary to aid in rapid penetration of the oil by the active surfactants, which are only effective when properly oriented at the oil/water interface. The spray pattern should be flat, striking the water in a line perpendicular to the direction of the boat's travel. The nozzle's spray angle should be such that the fan-shaped sprays from adjacent nozzles overlap just above the water. No special mechanical mixing devices are necessary. The normal motion of the sea and the wake of the workboat are adequate.

COREXIT 9527 may also be applied by eduction into a fixed fore-hose system on board a tug or workboat. The dose should be carefully regulated, since most fire systems have very large capacities. Most often a seawater bleed should be inserted before the point of chemical entry. Also, it is important to attempt to maximize coverage be directing the hose stream at about 45 degrees upward. Direct high-pressure hosing will often be unsuccessful because the active surfactants are driven through the slick into the water without an opportunity to attach to the oil.

HELICOPTER/AIRPLANE SPRAYING

Aircraft provide the most rapid method of applying dispersant to an oil spill. For aerial spraying COREXIT 9527 is used undiluted. A treatment rate of about 5 USG per acre is recommended, but this may need adjustment, depending on the type of oil and the thickness of the slick. A variety of fixed-wing aircraft can be used for spraying over a large area. These range from very small to very large aircraft equipped for carrying 100 to over 4,000 U.S. gallons of chemical.

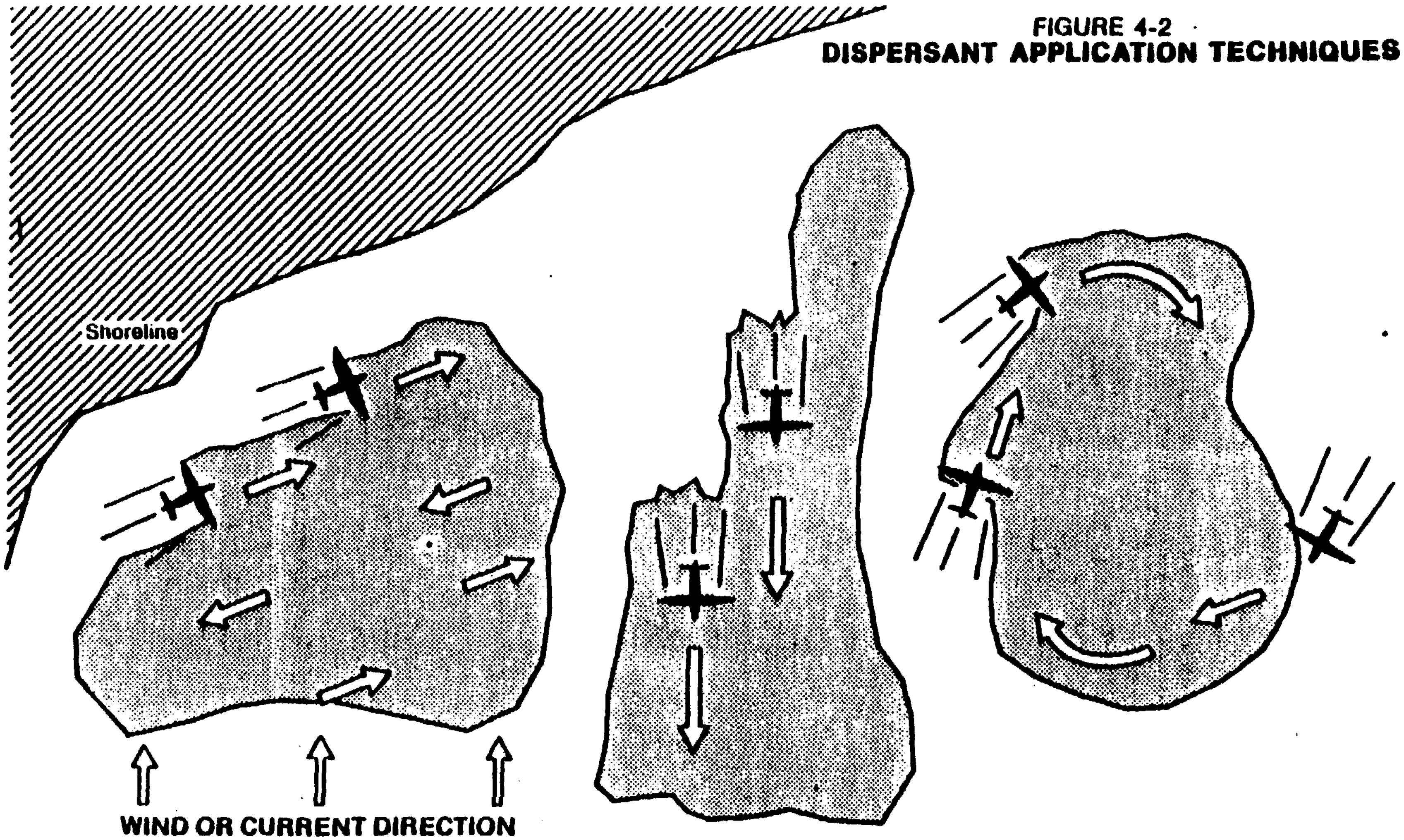
The spray nozzles used are most critical, since droplet size must be controlled. Many nozzles used for agricultural spraying are of low capacity and produce too fine a spray (actually a mist or fog) which is not desirable for dispersant spraying. Careful selection of nozzle capacity to achieve desired dose levels cannot be overemphasized.

Calculations similar to those mentioned previously for workboat spraying should also be made for aerial application. Consideration must be given to: the speed and altitude of the plane; the capacity of the chemical pumps; the pressure at which they operate; the effective swath width obtained; and any windage losses. Flights should be made directly into the wind for best results.

Helicopters may also be employed in aerial spraying, either with fixed spray booms, or by attachment of a slung-bucket system equipped with spray booms. If a bucket is used, it should be stabilized against rotating and swaying.

Tests have shown that an altitude of 30 to 50 feet is optimum for both helicopters and fixed-wing aircraft. Speed will vary with aircraft type, spray boom width, and pump capacity.

FIGURE 4-2
DISPERSANT APPLICATION TECHNIQUES



- The most desirable spraying procedure is to work in a circular fashion at the edges of the spill, thus containing the oil and retarding its spread (diagram above, right).
- If wind or current is rapidly moving oil toward the shoreline, spraying parallel to the shoreline at the advancing edge of the spill is recommended (diagram above, left).
- Aerial application of dispersant should always be directly into the wind, although some small aircraft can operate safely downwind. Do not apply dispersants cross-wind, since dosage control is not possible.

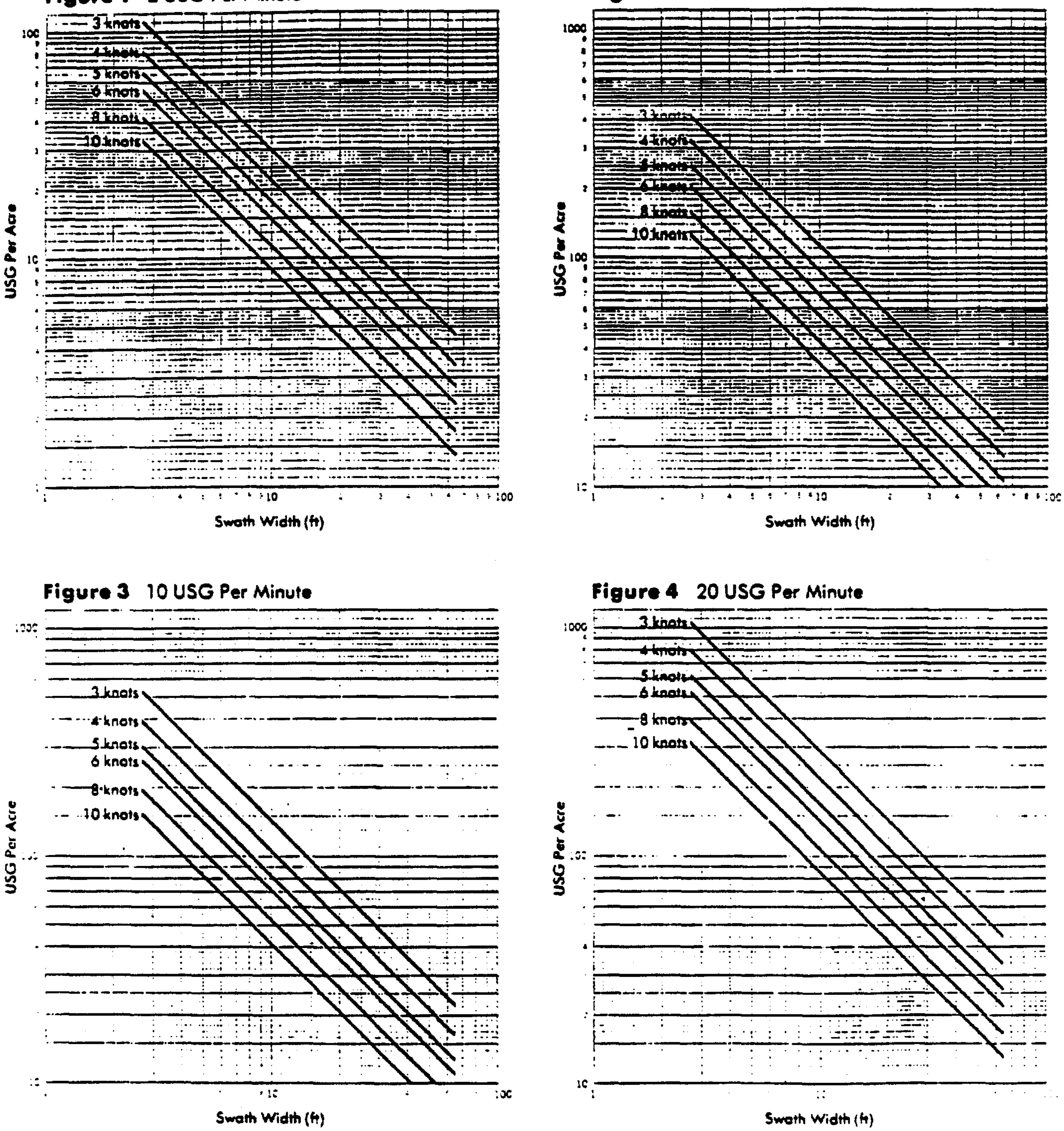
Chemical Dose Per Acre from Spray Booms Of Various Swath Widths Mounted on Workboat Traveling At 3 to 10 Knots Using a Chemical Pump Operating at 2 to 20 USG Per Minute

Figure 1 2 USG Per Minute

Figure 2 8 USG Per Minute

Figure 3 10 USG Per Minute

Figure 4 20 USG Per Minute



Relationship Between Boat or Aircraft Speed and Chemical Pump Rate for Dispersant/Oil Ratio of 1:10 to 1:50

Swath Widths in Meters. Slick Thickness in Millimeters.

Figure 8 1:10 Ratio

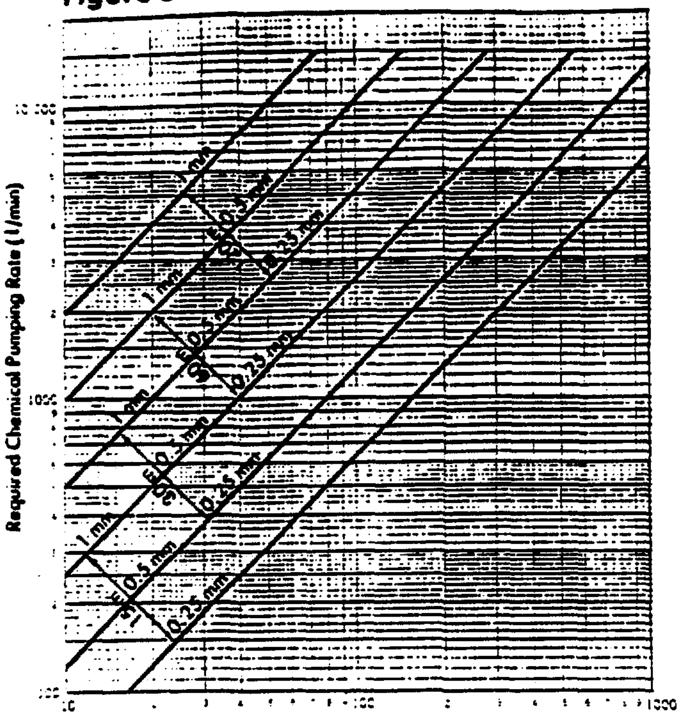


Figure 9 1:20 Ratio

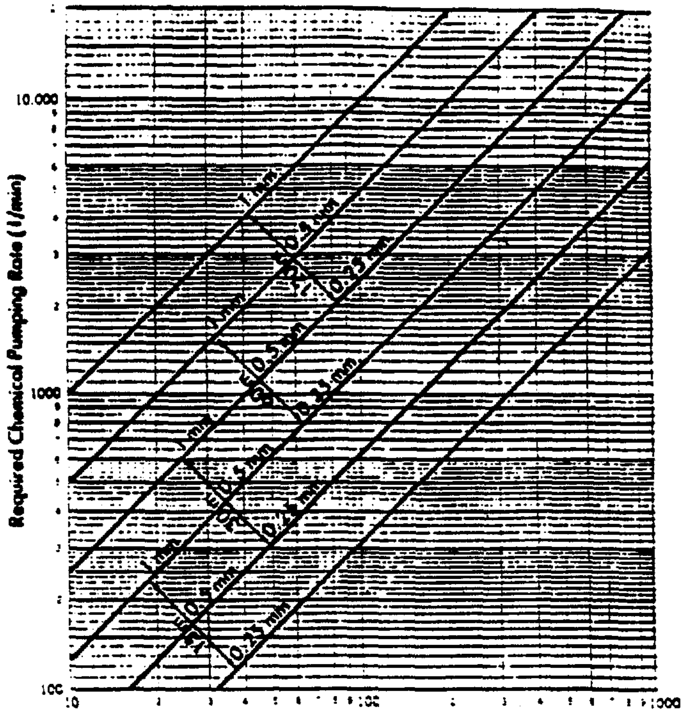


Figure 10 1:30 Ratio

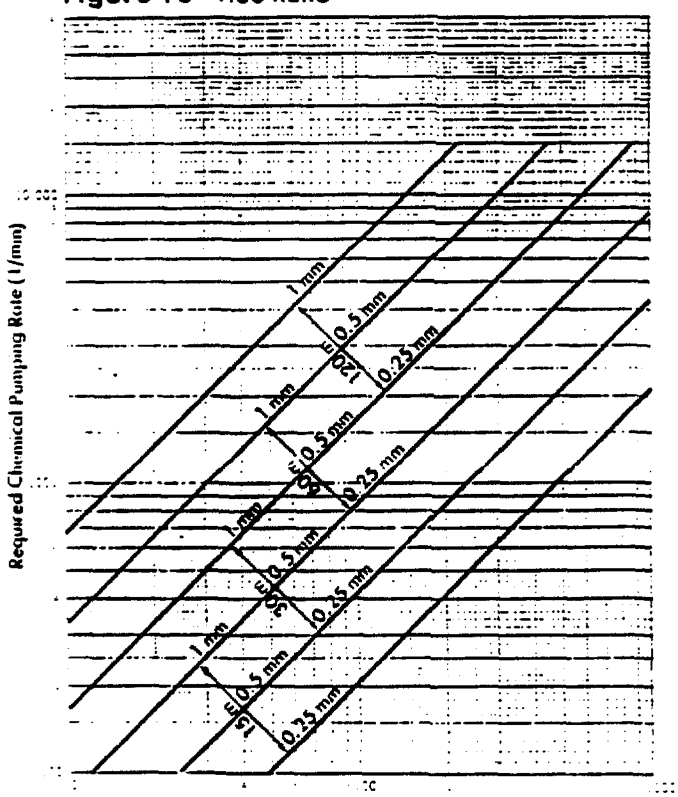


Figure 11 1:50 Ratio

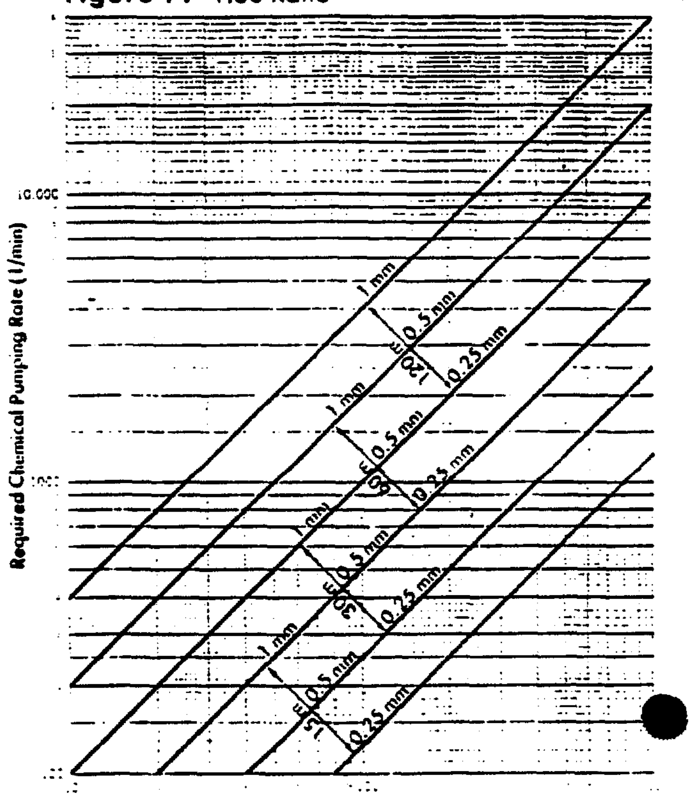


Table 1

Correlation of Oil Volume Per Unit Area with Slick Thickness

USG/acre	USG/hectare	bbl/mi²	bbl/km²	bbl/acre	ml/ft²	ml/m²	ft³/acre	l/hectare	Thickness of Stabilized Film (mm)
4.2	10.37	64	25	0.10	0.36	3.87	0.56	38.7	3.94×10^{-3}
5	12.35	76	29	0.12	0.43	4.63	0.67	46.3	4.69×10^{-3}
8.4	20.76	128	49	0.20	0.73	7.85	1.12	78.5	7.88×10^{-3}
10	24.71	152	59	0.24	0.87	9.36	1.33	93.6	9.30×10^{-3}
12.6	31.13	192	74	0.30	1.09	11.73	1.68	117.3	1.18×10^{-2}
21	51.89	320	123	0.50	1.82	19.58	2.80	195.8	1.97×10^{-2}
42	103.78	640	247	1.00	3.65	39.27	5.60	392.7	3.94×10^{-2}
50	123.55	762	294	1.19	4.33	46.58	6.67	465.8	4.66×10^{-2}
53.6	132.44	817	315	1.28	4.65	50.03	7.16	500.3	5×10^{-2} (50μ)
84	207.56	1280	494	2.00	7.30	78.54	11.20	785.4	7.88×10^{-2}
100	247.10	1524	588	2.38	8.67	93.27	13.33	932.7	9.33×10^{-2}
150	370.65	2286	882	3.57	13.01	139.97	20.00	1399.7	0.14
168	415.13	2560	988	4.00	14.60	157.07	22.40	1570.7	0.16
214.6	530.28	3270	1262	5.11	18.58	199.89	28.61	1998.9	0.20
250	617.75	3810	1471	5.95	21.65	232.92	33.33	2329.2	0.23
268	662.23	4088	1578	6.38	23.23	249.92	35.76	2499.2	0.25
420	1037.82	6400	2470	10.00	36.50	392.68	56.00	3926.8	0.39
525	1297.27	8000	3088	12.50	45.62	490.80	70.00	4908.0	0.49
535.8	1323.96	8165	3155	12.76	46.45	499.73	71.44	4997.3	0.50
839	2073.17	12800	4941	20.00	72.91	784.39	111.87	7843.9	0.79
1071.6	2647.92	16329	6303	25.51	93.12	1001.82	142.88	10018.2	1.00
1607	3971.88	24494	9454	38.26	139.68	1502.73	214.32	15027.3	1.50

μ = microns

Table 2

Dispersant Requirements for Spill Covering 10 Square Miles

Slick Thickness (mm)	Oil Volume bbl	Oil Volume USG	Dispersant Required (USG) @ 5gpa	@ 7gpa	@ 1:10	@ 1:20	@ 1:30	@ 1:50
0.14	22,860	960,120	32,000 (1:30)	44,800 (1:21)	96,012	48,006	32,000	19,200
0.25	40,880	1,716,960	32,000 (1:53)	44,800 (1:38)	171,969	85,848	57,232	34,339
0.50	81,650	3,429,300	32,000 (1:107)	44,800 (1:76)	342,930	171,465	114,310	68,568
1.00	163,290	6,858,180	32,000 (1:214)	44,800 (1:153)	685,818	342,909	228,606	137,163
2.50	408,230	17,145,660	32,000 (1:535)	44,800 (1:383)	1,714,566	857,283	571,522	342,913

gpa = gallons per acre

Table 3

Volume of Oil Per Acre (bbl)
Which Can Be Treated at Various Doses of
Dispersant Per Acre (USG)

Dispersant to Oil Ratio	Dispersant Per Acre (USG) 5	7	10	20	50
1:1	0.12	0.17	0.24	0.48	1.20
1:2	0.24	0.33	0.47	0.94	2.35
1:4	0.47	0.65	0.94	1.80	4.70
1:10	1.20	1.70	2.40	4.70	12.00
1:20	2.40	3.30	4.70	9.40	23.50
1:30	3.50	5.00	7.20	14.30	36.00
1:50	5.90	8.40	11.90	23.80	59.50
1:100	11.90	16.60	23.80	47.70	119.00

Table 4

Spraying Logistics for Solvent-Based
Dispersant from Workboat with Low-Volume Pumps
Delivering 2-20 USG Per Minute

knots	min/acre	Approximate Dosage (USG/Acre) 2 gpm	4 gpm	6 gpm	8 gpm	10 gpm	20 gpm
8-ft swath width							
3	17.93	35	73	109	143	180	358
4	13.46	28	53	80	108	135	270
5	10.76	23	43	65	88	108	215
6	8.97	18	38	55	73	90	180
16-ft swath width							
3	8.97	18	36	54	71	90	179
4	6.73	14	26	40	54	68	135
5	5.38	11	21	33	44	54	108
6	4.48	9	19	28	36	45	90
20-ft swath width							
3	7.17	14	29	43	57	72	143
4	5.38	11	21	32	43	54	108
5	4.31	9	17	26	35	43	86
6	3.59	7	15	22	29	36	72
30-ft swath width							
3	4.78	10	19	29	38	48	96
4	3.59	7	15	22	29.	36	72
5	2.87	6	11	17	23	28	57
6	2.39	5	9	14	19	24	48

Table 7

Workboat Spray Data

knots	ft/sec	Time (min) to Cover One Acre for Various Swath Widths (ft) 20	30	40	Acres/Hour for Various Swath Widths (ft) 20	30	40
1	1.69	21.48	14.32	10.74	2.79	4.19	5.59
2	3.37	10.77	7.18	5.39	5.57	8.36	11.13
3	5.06	7.17	4.78	3.59	8.37	12.55	16.71
4	6.75	5.38	3.59	2.69	11.15	16.71	22.30
5	8.43	4.31	2.87	2.16	13.92	20.90	27.78
6	10.12	3.59	2.39	1.80	16.71	25.10	33.33
7	11.81	3.07	2.05	1.54	19.54	29.27	38.96
8	13.49	2.69	1.79	1.35	22.30	33.52	44.44
9	15.18	2.39	1.59	1.20	25.10	37.74	50.00
10	16.87	2.15	1.43	1.08	27.91	41.96	55.55

Basis: 6076 feet per nautical mile

Minutes to cover one acre* = travel distance per acre in feet ÷ speed in feet per second × 60.

*See Table 8 for travel distance time per acre for various swath widths

Table 8

Travel Distance Required for Spray Boat or Aircraft To Apply Dispersant to One Acre or One Hectare

Total Swath Width ft	meters	Travel Distance ft/acre	m/hectare
8	2.44	5445	4098
10	3.05	4356	3279
16	4.88	2722	2049
20	6.10	2178	1639
25	7.62	1742	1312
30	9.14	1452	1094
40	12.19	1089	820
50	15.24	871	656
60	18.29	726	547
70	21.34	622	469
80	24.38	545	410
100	30.48	436	328
120	36.58	363	273
150	45.72	290	219
200	60.96	218	164
225	68.58	194	146
250	76.20	174	131
300	91.44	145	109
350	106.68	124	94
400	121.92	109	82

Distance in ft/acre = 43,560 ÷ swath width in feet.

Distance in m/hectare = 10,000 ÷ swath width in meters.

Table 9

Maximum Area Covered in 16 Hours* at Various Boat Speeds for Swath Widths of 20, 30 and 40 Feet

knots	20-ft Swath Width acres	mi^2	30-ft Swath Width acres	mi^2	40-ft Swath Width acres	mi^2
1	45	0.07	67	0.10	89	0.14
2	89	0.14	134	0.21	178	0.28
3	134	0.21	201	0.31	267	0.42
4	178	0.28	267	0.42	357	0.58
5	223	0.35	334	0.52	444	0.69
6	267	0.42	402	0.63	533	0.83
7	313	0.49	468	0.73	623	0.97
8	357	0.56	536	0.84	711	1.11
9	402	0.63	604	0.94	800	1.25
10	446	0.70	671	1.05	889	1.39

*Gallons per acre x acres = Gallons per 16 hours

(Boat size may restrict load, therefore requiring re-loading at chemical stock point with attendant loss of transit time.)

Table 10

Dose Rate Factor, f (USG/Acre)

For Boat Speeds of 1-10 Knots with 1% Chemical
Addition into Various Total Pump Capacities (gpm)
And with Spray Boom Swath Widths of 20, 30 and 40 Feet

	20-ft Swath Width				30-ft Swath Width				40-ft Swath Width			
	Pump Capacity (gpm)				Pump Capacity (gpm)				Pump Capacity (gpm)			
knots	8	20	80	100	8	20	80	100	8	20	80	100
1	1.72	4.30	17.18	21.48	1.15	2.86	11.46	14.32	0.86	2.15	8.59	10.74
2	0.86	2.15	8.62	10.77	0.57	1.44	5.74	7.18	0.43	1.08	4.31	5.39
3	0.57	1.43	5.74	7.17	0.38	0.96	3.82	4.78	0.29	0.72	2.87	3.59
4	0.43	1.08	4.31	5.39	0.29	0.72	2.87	3.59	0.22	0.54	2.15	2.69
5	0.34	0.86	3.45	4.31	0.23	0.57	2.30	2.87	0.17	0.43	1.72	2.15
6	0.29	0.72	2.87	3.59	0.19	0.48	1.91	2.39	0.14	0.36	1.43	1.79
7	0.25	0.61	2.46	3.07	0.16	0.41	1.64	2.05	0.12	0.31	1.23	1.54
8	0.22	0.54	2.15	2.69	0.14	0.36	1.43	1.79	0.11	0.27	1.08	1.35
9	0.19	0.48	1.91	2.39	0.13	0.32	1.27	1.59	0.10	0.24	0.95	1.19
10	0.17	0.43	1.72	2.15	0.11	0.29	1.14	1.43	0.09	0.22	0.86	1.08

How to Use Table

- Multiply table value by percent of chemical addition to obtain dose rate.
- To obtain f for different pump rate, P, divide P by next lowest pump rate in table, P', and multiply result by f in ta. for P'.
- To obtain f for different speed, K, divide f in table (for proper pump rate, swath width, and speed, K') by K, and multip., result by reference speed in table, K'.
- Dose rates for undiluted chemical are 100 times the factors shown.

liters per hectare = USG per acre x 9.353
liters per minute = USG per minute x 3.79
U. S. gallons per square mile = USG per acre x 640

Aerial Spray Data

		Time (sec) to Cover One Acre For Various Swath Widths (ft)*				Acres Per Minute of Spraying Time for Various Swath Widths (ft)			
knots	ft/sec	100	120	150	200	100	120	150	200
50	84.33	5.17	4.30	3.44	2.58	11.6	13.9	17.4	23.3
60	101.20	4.31	3.59	2.86	2.15	13.9	16.7	20.9	27.9
75	126.50	3.45	2.87	2.29	1.72	17.4	20.9	26.2	34.9
100	168.67	2.58	2.15	1.72	1.29	23.2	27.9	34.9	46.5
150	253.00	1.72	1.43	1.15	0.86	34.9	41.9	52.2	69.8
200	337.33	1.29	1.08	0.86	0.65	46.5	55.5	69.8	92.3

Acres ÷ 640 = Square Miles

*Total spraying time per trip can be calculated for individual aircraft by considering tank and pump capacity and dose per unit area.

Table 12

Boat Speed in Knots Required for Various Doses Per Acre

For Different Chemical Eduction Rates and Total
Pump Volumes into Swath Widths of 20, 30 and 40 Feet

Table Shows Speed in Knots

Chemical Eduction Percent	Pump (gpm)	20-ft Swath Width, Dispersant (gpa) 5	7	10	30-ft Swath Width, Dispersant (gpa) 5	7	10	40-ft Swath Width, Dispersant (gpa) 5	7	10
2%	80	6.9	4.9	3.4	4.6	3.3	2.3	3.4	2.5	1.7
	100	8.6	6.1	4.3	5.7	4.1	2.9	4.3	3.1	2.1
	150	12.9	9.2	6.4	8.6	6.1	4.3	6.5	4.6	3.2
5%	80	17.2	12.3	8.6	11.5	8.2	5.7	8.6	6.1	4.3
	100	21.5	15.4	10.7	14.3	10.2	7.2	10.8	7.7	5.4
	150	32.3	23.1	16.1	21.5	15.4	10.7	16.1	11.5	8.1
6%	80	20.7	14.8	10.3	13.8	9.8	6.9	10.3	7.4	5.2
	100	25.8	18.4	12.9	17.2	12.3	8.6	12.9	9.2	6.4
	150	38.7	27.7	19.3	25.9	18.4	12.9	19.4	13.8	9.7
7%	80	24.1	17.2	12.0	16.1	11.5	8.0	12.0	8.6	6.0
	100	30.1	21.5	15.0	20.1	14.3	10.0	15.1	10.8	7.5
	150	45.2	32.3	22.6	30.1	21.5	15.0	22.6	16.1	11.3
10%	80	34.4	24.6	17.2	22.9	16.4	11.5	17.2	12.3	8.6
	100	43.0	30.7	21.5	28.7	20.5	14.3	21.5	15.4	10.7
	150	64.5	46.1	32.2	43.0	30.7	21.5	32.3	23.0	16.1

Table 13

Pump Rate Required (USG/min)

For Chemical Doses of 5, 7 and 10 USG
Per Acre Over Swath Widths of 100-400 Feet from
Aircraft Traveling at 30-200 mph (26-174 knots)

mph	knots	100-ft Swath Width 5 gpa	7 gpa	10 gpa	200-ft Swath Width 5 gpa	7 gpa	10 gpa	300-ft Swath Width 5 gpa	7 gpa	10 gpa	400-ft Swath Width 5 gpa	7 gpa	10 gpa
30	26	30	42	60	60	85	120	91	127	182	120	169	242
50	43	51	71	101	101	141	202	152	212	303	202	282	403
100	87	101	141	202	202	284	404	303	424	606	404	568	811
120	104	121	169	242	242	339	484	361	506	723	484	677	968
150	130	152	212	303	303	424	606	455	636	909	606	840	1200
175	152	176	247	353	353	494	706	526	737	1053	706	1000	1429
200	174	201	282	405	405	568	810	600	840	1200	810	1135	1622

gpa = gallons per acre

DOC NO 80SPC T14

PERFORMANCE CHEMICALS

EXXON CHEMICALS

E' 'XON CHEMICAL COMPANY

823 dman Street, Houston, Texas 77029

SPE. .TIES LABORATORY

Technical Service Report

EFFECT OF OIL SPILL DISPERSANTS

ON

MONTEREY CRUDE OIL

TSR NUMBER: 6807-38

REQUESTED BY: A. D. Mitchell

DATE RECEIVED: June 16, 1980

ANALYSED BY: G. P. Lindblom

Using the sample of Monterey Crude (South Elwood Offshore) sent to us by Mr. R. E. Carlson of ARCO Oil and Gas Company, we have run several laboratory tests with different types of dispersants.

This oil, while extremely viscous, flows easily and spreads rapidly on the surface of seawater. However, additional oil deposited on this initial slick spreads very slowly, and remains in rather thick lenses.

In our tests, COREXIT 9527 Oil Dispersant Concentrate was very active in causing interfacial tension reduction between the oil and water. After the chemical reaches the interface, only slight agitation of the water in the laboratory dish is necessary to cause complete dispersion. While penetration of this oil by COREXIT 9527 is slowed in the quiescent lab test it can be expected to proceed faster when used on a slick on an active sea, after the chemical has been delivered from sprayboats or aircraft. Both the rate of dispersant penetration and of slick breakup are much greater on the thinner oil film at the advancing edge of the slick. Also, both increase markedly as the API gravity of the oil treated increases.

Since the sample oil probably represents a "worst case" (insofar as API gravity is concerned) for the California situation, COREXIT 9527 is certainly the best available choice for a single stockpiled dispersant. Of course, hydrocarbon solvent based dispersants are faster penetrants of heavy oil films but require much higher doses, perhaps as much as 5 to 10 times more. The breakup using COREXIT 8667 (a solvent-based product) is less complete with the Monterey oil than that obtained with COREXIT 9527. Larger pieces of this oil remain in a very milky solution at the ocean surface when treated with solvent-based products. More ocean energy or mechanical agitation is also necessary.

In addition to evaluating the effects of dispersants, we also noted in the laboratory that a surface collecting agent (COREXIT OC-5), applied to the <u>water</u> around the periphery of spreading Monterey crude, was extremely effective in preventing further spread and in greatly limiting the area of involvement. With this heavy crude a very stable edge was formed with the collector. This would be very valuable in aiding skimmer operations or sorbent use, if either were feasible.

OIL SPILL DISPERSANT TEST PROCEDURE

Using the same sample of Monterey Crude Oil (API 16) as mentioned in the earlier report (DOC-80-SPCT-149), testing was expanded to include effectiveness at 58°F and a comparison of Monterey Crude Oil and Kuwait Crude Oil at same dose rate, the effectiveness procedure given in DOC-80-SPCT-42 was followed.

Six ounce oval prescription bottles were filled with 4½ ounces of synthetic sea water and 5 mls of same KWO was added to half the bottle using a disposable syringe. Five mls of MCO was added to the remaining bottles. Half the bottles were then cooled to 58°F and the remainder remained at ambient temperature (78°F).

The oil films (about 3 mils thick) were then treated with the appropriate amount of dispersant to give the desired dispersant to oil ratio. The treated bottle was gently rocked and the initial film breakup and oil droplet size observed. The bottle was then rotated end over end and allowed to stand. Observation of the rise time (resuspension) of the droplet provides another point of evaluation.

Finally, the bottle is turned on its side to obtain the maximum water surface; and again, with gently rocking, observation of the droplet movement near the bottle side is made.

This test shows that dispersant chemicals themselves do not disperse oil; rather, they reduce the strength of the oil film so that it becomes easily dispersible when natural or mechanical energy is applied. It is the movement of the water after treatment which really causes the dispersion of oil droplet from a treated slick.

Without the addition of chemical, large masses and pieces of oil result, and Tarbal - Mousse formation is promoted. The results of a 1-25 and 1-30 dispersant to oil trea rate gave identical results in this test. As to be expected, the COREXIT 9527 on KCO showed easy film breakup and a nice cloud of dispersed oil when gently rocked at ambient temperature.

On 58°F KWO and sea water, the results were the same. On MCO at the same treat ratios and ambient temperature, the initial film breakup required more energy (rocking movement) but the final result was a nice cloud of dispersed oil equal to that of the 9527 Kuwait bottle test.

On the 58°F MCO test, the results were the same as at ambient temperature. At a ratio of 1-40 D/O the results are still excellent for the Kuwait at ambient and 58°F and the Monterey at ambient, but at 58°F the MCO shows a start of resuspension before 5 minutes The usual dose ratio is from 1-30 to 1-40 D/O, so COREXIT 9527 would be effective on MCO at 58°F and a minimum dose ratio of 1-40. Any dispersant chemical used on heavy and/or cold crude oil will require longer to penetrate and more energy (like wave energy) for treating as mentioned in DOC-80-SPCT-149.

Hydrocarbon products must be applied at a much higher dose rate and leave a milky appearance on the surface of the water. Of the non hydrocarbon products, C-9527 was better than anything tested.

10. RISK ANALYSIS

4.g.1.b Oil Spill Risk Analysis

4.g.1.b.1 Methodology and Assumptions

Methodology

The oil spill risk analysis methodology used in this report allows calculation of the probable number of oil spills of a given minimum volume that statistically could occur during the life of the Shamrock Project. The steps involved in performing the risk analysis are as follows:

(1) Oil recovery and transport operations are separated into independent "categories" of operations for which historical accident data are available. Since oil spill rates are different for different types of facilities, the project is divided into components for which the risk can be determined separately. The total risk is then computed from the sum of the risks associated with the individual components. Categories used in the Shamrock Project analysis are platform spills and OCS pipeline spills.

(2) The appropriate "exposure variable" for each spill category is determined. The exposure variables associated with the platform are "well-years" for blowouts and "platform-years" for non-blowout spills. Two exposure variables are used because daily platform operations present a very different level of risk than does well drilling and production. The pipeline exposure variable is "pipeline mile-years".

(3) The historical accident rate of the exposure variables and the frequency distributions of the number of spill for spill volume classes of 10, 100, 1000, and 10,000 barrels (bbl) are calculated from available data sources.

(4) Using the project exposure data, the "expected value" of each exposure category for the project is determined. For example, if the historical data indicate a platform blowout exposure variable of 0.000143 spill per well-year, and the project is projected to include 60 wells and have a 15-year lifespan (an exposure of 900 well-years), then the expected value for platform blowouts is:

$$0.000143 \ \frac{\text{spill}}{\text{well-year}} \times 60 \text{ wells} \times 15 \text{ years} = 0.1287 \text{ spill}$$

The expected values of the exposure variables for each category are summed to provide the total expected value for the entire project.

(5) The probability of a given number of spills occurring within specified spill volume classes during the project life is then calculated assuming the spills occur randomly and can be described by a Poisson distribution. The assumption of a Poisson distribution allows the probability of all integer number of spills per project life to be predicted once the expected value is known for each of the spill classes.

Assumptions

Any attempt to predict future accidental events involves inherent uncertainty. However, if certain assumptions are made regarding the nature of the accidents, it is possible to extrapolate observed events and trends into the future. The major assumptions made in this analysis are discussed below.

Assumption 1. Oil spills occur relatively rarely in a purely random manner independent of other events and, therefore, can be represented by a Poisson probability distribution.

It is assumed that oil spills can happen at any time and are independent of other events such as a spill in another location or severe weather conditions. Also, the spills are assumed to occur rarely with respect to the times they do not occur. Under these conditions, the Poisson distribution can be used to compute the probability of an integer number of independently random events occurring in a specified timeframe given that the statistically expected number of events in that timeframe is known. The Poisson distribution is given by:

$$P(n,L) = \frac{L^n \exp(-L)}{n!}$$

where: $P(n,L)$ = the probability that n events will occur given a statistical expectation of L events,

$$n! = (n)(n-1)(n-2)...(1)$$

Assumption 2. Past spill data provide a reliable indicator of future spills.

Statistical analysis can give an indication of trends in accident rates and, therefore, indicate which historical data are appropriate for use in predicting the near future. An example of these trends is shown in the data of Nakassis (1982), Figure 4.g-2. The figure shows the statistically estimated offshore production spill rates in terms of spills greater than 1000 bbl per billion bbl produced for the years 1964 to 1979. It can be seen that using the average 1965 to 1967 spill rate to predict 1979 spill rates would have overestimated the spill rate by a factor of 540% and that using the 1976 to 1978 data to estimate the 1979 rate overestimates by a factor of 15%. In this analysis, 1973 to 1975 data were used which would have overestimated the 1979 rate by 50%.

Assumption 3. The underlying causes of oil spills will be the same in the future as they have been in the past.

If it is assumed that spills are caused by human error and equipment failure then the underlying causes of oils spills should remain the same in the future. Implicit in this assumption is the corollary that either all types of accidents that will occur have already occurred once or, if an accident type has not already occurred, it probably happens too infrequently to be statistically significant.

Assumption 4. Causes of oil spills on the California OCS are the same as for other U.S offshore areas and regions of the world where historical spill data have been collected.

The number of blowouts and pipeline spills on the California OCS is so small that it is not possible to develop the necessary statistics from the Pacific region alone. Therefore, data from other areas, such as the Gulf of Mexico, must be used.

There are notable differences between offshore California and the Gulf of Mexico OCS. Operation in the Gulf of Mexico OCS involves greater risk than the California OCS because of more severe sea and weather conditions (particularly hurricanes) and significantly greater vessel traffic. While some adjustment of Gulf of Mexico spill rates is justifiable, such as neglecting spill causes which do not apply to the California OCS (e.g., hurricanes), the remaining non-specific data must be used in the risk analysis. Use of the Gulf of Mexico data probably leads to considerable overestimation of the spill risk.

Assumption 5. Oil spill occurrence rates will not be affected by improvements in spill prevention technology or regulatory requirements imposed on OCS operators.

This assumption implies that nothing operators or regulatory bodies do will reduce the rate of spills. Inspection of the data summarized in Figure 4.g-2 suggests that this is not true. As an example, implementation of OCS Order No. 8 for platform operations has been shown to have decreased spill rates (Nakassis, 1982). However, due to the difficulty in predicting future rate changes associated with each project category, the conservative assumption of no change in rates was made in this risk analysis. As technology and regulatory improvements are introduced, the number of spills from spill-prone elements and the spill rates should drop. Therefore, by assuming the rates will be constant, the analysis probably overestimates the expected number of spills.

Assumption 6. Exxon's success in preventing spills from the Shamrock Project will be typical or average for the industry as inferred from past industrywide performance.

Operator-related spill data indicate that not all OCS operators have equal performance records in the prevention and containment of oil spills (Danenberger, 1976; MMS, 1979). The use of industry average data for better-than-average operators results in conservative estimates with the converse applying to worse-than-average operators. Because of Exxon's generally good operating record, applying the industry average to the Shamrock Project is expected to result in a conservative estimate of the spill risk.

4.g.1.b.2 Historical Spill Rate and Volume Data

Historical data indicate that spill sizes range from a few gallons to over a million barrels. However, most of the oil spilled is associated with a few very large spills (e.g., the IXTOC I spill released more oil than all other 1979 spills combined). Because there are many more small spills than large, the frequency distribution of spill sizes is highly non-uniform; consequently, it is difficult to describe the entire frequency distribution accurately.

In addition, oil spill data are often difficult to obtain (Futures Group, 1982) and are of limited accuracy because of the necessity to make visual judgments of the volumes released. For example, fairly reliable estimates of the volume released in the 1969 Santa Barbara oil spill range from 10,000 to 77,000 bbl (USGS, 1983).

The above factors indicate considerable caution is required in developing and interpreting quantitative spill risk statistics. For example, it has been noted (MIT, 1974) that the confidence intervals on estimated total spill volume are much larger than the spill volume itself. However, the rate of spill occurrence and the spill size distributions separately exhibit distinctive patterns. Therefore, estimating the spill rates and size distributions separately and recombining them to estimate the probability of spill occurrence as a function of spill size results in greater predictive accuracy than attempting to estimate a total spill volume.

The following sections provide a summary of the spill rates and volumes used in the risk analysis as developed from historical records. The pertinent spill categories for the Shamrock Project are platforms and offshore pipelines.

Platforms

Platform spills are separated into blowout and non-blowout exposure categories due to the marked differences in the two sets of historical spill rates and volume distributions. Typically, blowouts occur infrequently but release large volumes while non-blowouts, or operational spills, occur more frequently but release very small volumes.

Platform Blowout Spills: The historical rate of blowout spills used in this analysis was derived by Stewart and Kennedy (1978) from the USGS Event File covering the period 1964 to 1975. Applying the logic that the more wells that are drilled and the longer they are in use the greater the probability of a blowout, leads to the selection of "well-years" as the appropriate exposure variable. This variable reflects both drilling blowouts and the large proportion of non-drilling blowouts (Danenberger, 1976 and 1980). The inferred rate of blowouts appropriate to California OCS operations (i.e., non-hurricane induced blowouts) which resulted in oil spillage of greater than 1 bbl is 7 blowout spills in 49,100 well-years of operation which translates to a spill rate of 1.43×10^{-4} blowout per well-year.

Although more recent data are available for the period 1979 through 1982 (USGS, 1983), the data presented in that report are insufficient to update the spill rate estimates. It should be noted that all of the 31 blowouts reported from 1979 through 1982 occurred in the Gulf of Mexico. The USGS (1983) report concludes that the rate of blowouts is declining because of MMS emphasis on training as well as improved equipment and well-control methods. Therefore the use of the Stewart and Kennedy (1978) data is expected to be conservative.

In addition to spill rate data, the distribution of spill volumes is needed in the risk analysis. Stewart and Kennedy (1978) derived a cumulative probability density function of the volume distribution of blowout spills which is shown on Figure 4.g-3. By defining size classes of spills greater than 10, 100, 1000, and 10,000 bbl, the density function can be used to estimate the proportion of spills occurring in each class. The results of numerical offsets to Figure 4.g-3 are given in the following table.

Volume Distribution of Blowout Spills

Spill Volume, bbl	Probability of a Blowout Spill > 1 bbl in this Class
>10	0.952
>100	0.847
>1000	0.577
>10,000	0.302

Non-blowout Platform Spills: Non-blowout or operational spills have very different spill rates and volumes from blowout spills and are therefore considered separately. Typically, while operational spills occur more frequently than blowout spills they release far smaller volumes of oil. Since operation spills are related to platform numbers and years of operation the appropriate exposure variable is "platform-years".

Using the MMS (USGS) Event File for 1973 to 1975, Stewart and Kennedy (1978) analyzed the historical non-blowout spill data for spills greater than 1 bbl. They detected a trend for "new" platforms, i.e., those less than 10 years old, to experience break-in problems which led to higher spill rates than "old" platforms (greater than 10 years old). Consequently, two rates of operational spills are used in the analysis. They are 4.3×10^{-2} and 2.6×10^{-2} spills/platform-year for new and old platforms, respectively. As in the case of blowout spills, the rate of operational spills appears to be dropping and, therefore, the above operational spill rates are probably conservative.

The oil spill size cumulative frequency distribution for operational spills is shown on Figure 4.g-4. The following table summarizes the volume distributions used in the risk analysis for operational spills.

Volume Distribution of Platform Operational Spills

Spill Volume, bbl	Probability of a Non-blowout Spill >1 bbl in this Class
>10	0.117
>100	0.001
>1000	< 0.001
>10,000	< 0.001

Offshore Pipelines

The exposure variable for offshore pipelines, "pipeline mile-years", reflects that the causes of pipeline spills such as corrosion, weld failure, and accidental puncture are a function of the length of pipeline and time. The volume of oil carried through the pipeline does not significantly contribute to pipeline failure. The calculated distribution of spill volumes is based on the assumption that the pipeline diameters and flow rates for the Shamrock Project are average for the industry.

Using data from the MMS Pipeline Management System's Segment Specific Pipeline List for 1973 to 1975 and the MMS (USGS) Event File, Stewart and Kennedy (1978) estimated a cumulative exposure of 3700 pipeline mile-years for offshore pipelines. During this period there were 76 spills greater than 1 bbl. The average spill rate from offshore pipelines was therefore calculated to be 2.1×10^{-2} spills per pipeline-year.

The oil spill size cumulative frequency distribution for offshore pipeline spills is shown on Figure 4.g-5. The table below summarizes the volume distributions used in the risk analysis for offshore pipeline spills.

Volume Distribution of Offshore Pipeline Spills

Spill Volume, bbl	Probability of a Pipeline Spill > 1 bbl in this Class
>10	0.232
>100	0.020
>1000	0.002
>10,000	<0.001

4.g.1.b.3 Analysis Results

Exxon is evaluating two possible development options for the Shamrock Project. Both options include a drilling and production platform on Lease OCS P-0440 and a subsea oil pipeline. For the purposes of the oil spill risk analysis the Shamrock platform is assumed to have a life of 15 years (1986 to 2001) and that 60 wells will be drilled from the platform. Each well is assumed to have an average production life of 15 years. All of these assumptions are conservative; the current project plans call for a 12-year platform life and a 31-well development program. No injection wells are planned at this time.

In the Gaviota Option, the produced oil would be transported via pipeline to either Platform Hermosa or a nearby subsea tie-in on Lease P-0316. The Gaviota Option pipeline length is approximately 13.3 statute miles. In the Lompoc Option, the produced oil would be transported via pipeline to Platform Irene on Lease P-0441, a distance of 2.2 statute miles. The development option elements as they related to oil spill risk are summarized in the table below.

Elements of Development Options

	Gaviota Option	Lompoc Option
Platform	OCS P-0440	OCS P-0440
	60 wells	60 wells
Offshore Wet Oil	OCS P-0316	OCS P-0441
Pipeline	13.3 miles	2.2 miles

Gaviota Option

The oil spill risk exposures used in the analysis of the Gaviota Option are shown below.

Spill Type	Estimated Exposure	
Platform		
Blowouts	900	Well-years
Operational: Break-in Period	10	Platform-years
Operational: Post Break-in	5	Platform-years
Pipeline		
Leak or Rupture	199.5	Pipeline mile-years

Combining these exposures with the historical spill and volume data described previously yields the predictions of the statistically expected values of oil spills associated with the Gaviota Option. The expected values for the total project and the individual project elements are shown in Table 4.g-1. The table shows that only pipeline spills in the size class 10 bbl or larger have an expected value approaching 1. The probabilities of spill occurrence for the individual project elements within each of the four spill size classes is shown in Table 4.g-2. With the exception of pipeline spills in the size class of 10 bbl or greater, all the project elements show probabilities of greater than 83% of a spill NOT occurring in the project lifetime for all size classes.

The total oil spill probabilities for the Gaviota Option are listed in Table 4.g-3 and illustrated on Figure 4.g-6. The results show that there is a 96% probability of no 10,000-bbl or larger spills occurring and a 31% probability of no 10-bbl or larger spill. Table 4.g-3 shows that the 69% probability of a 10-bbl spill is distributed as a 36% probability of 1 spill, 21% probability of 2 spills, 8% probability of 3 spills, and 2% probability of 4 spills. Table 4.g-3 also indicates there is a 16% probability of 1 100-bbl or larger spill and a 8% probability of 1 1000-bbl or larger spill.

To summarize, one or more small spills (>10 bbl) are probable under the Gaviota Option, while a large spill (>10,000 bbl) is highly improbable.

Lompoc Option

The oil spill risk exposures used in the analysis of the Lompoc Option are shown below.

Spill Type	Estimated Exposure
Platform	
Blowouts	900 Well-years
Operational: Break-in Period	10 Platform-years
Operational: Post Break-in	5 Platform-years
Pipeline	
Leak or Rupture	33.0 Pipeline mile-years

Combining these exposures with the historical spill and volume data described previously yields the predictions of the statistical expected values of oil spills associated with the Lompoc Option. The expected values for the total project and the individual project elements are shown in Table 4.g-4. The table shows that none of the project elements have an expected value greater than 1. The probabilities of spill occurrence for the individual project elements within each of the four spill class sizes is shown in Table 4.g-5. All the project elements show probabilities of greater than 83% of a spill NOT occurring during the project life for all spill size classes.

The total oil spill probabilities for the Lompoc Option are listed in Table 4.g-6 and illustrated on Figure 4.g-7. The results show that there is a 96% probability of no 10,000-bbl or larger spills occurring and a 71% probability of no spill occurring in the 10-bbl or larger size class. The 29% probability of a 10-bbl spill is distributed as a 25% chance of 1 spill and a 4% probability of 2 spills. Table 4.g-6 indicates there is an 11% probability of a 100-bbl or larger spill and a 7% probability of a 1000-bbl or larger spill.

The lower risk of 10 and 100-bbl spills in the Lompoc Option as compared to the Gaviota Option is attributable to the shorter pipeline route. However, the risk of larger spills is similar for both options as larger spills are most likely to be related to platform drilling operations. In both options, the probability of a small spill is more likely than a large spill. A large spill is highly improbable in either case.

TABLE 4.g-1

SUMMARY OF STATISTICALLY EXPECTED SPILLS
GAVIOTA OPTION

Project Element	Statistically Expected Spills >10 bbl	>100 bbl	>1000 bbl	>10000 bbl
Platform	0.188	0.109	0.074	0.039
Emulsion Pipeline	0.972	0.084	0.008	0.000
Total	1.160	0.193	0.083	0.039

TABLE 4.g-2

PROBABILITY OF SPILL OCCURRENCE VERSUS SPILL VOLUME
FOR INDIVIDUAL PROJECT ELEMENTS
GAVIOTA OPTION

	V > 10 bbl[(a)]			V > 100 bbl		
	P(0 Spill)	P(1 Spill)	P(>1 Spill)	P(0 Spill)	P(1 Spill)	P(>1 Spill)
Platform	0.83	0.16	0.02	0.90	0.10	0.01
Emulsion Pipeline	0.38	0.37	0.25	0.92	0.08	0.00

	V > 1000 bbl			V > 10,000 bbl		
	P(0 Spill)	P(1 Spill)	P(>1 Spill)	P(0 Spill)	P(1 Spill)	P(>1 Spill)
Platform	0.93	0.07	0.00	0.96	0.04	0.00
Emulsion Pipeline	0.99	0.01	0.00	1.00	0.00	0.00

(a) V = Volume.
P = Probability (of the indicated number of spills occurring.

TABLE 4.g-3

TOTAL OIL SPILL PROBABILITY - GAVIOTA OPTION

>10 bbl[(a)]		>100 bbl		>1000 bbl		>10,000 bbl	
N	P(N)	N	P(N)	N	P(N)	N	P(N)
0	0.3135	0	0.8242	0	0.9207	0	0.9619
1	0.3636	1	0.1594	1	0.0761	1	0.0374
2	0.2109	2	0.0154	2	0.0031	2	0.0007
3	0.0816	3	0.0010	3	0.0001	3	0.0000
4	0.0237	4	0.0000	4	0.0000	4	0.0000
5	0.0055	5	0.0000	5	0.0000	5	0.0000
6	0.0011	6	0.0000	6	0.0000	6	0.0000
7	0.0002	7	0.0000	7	0.0000	7	0.0000
8	0.0000	8	0.0000	8	0.0000	8	0.0000
9	0.0000	9	0.0000	9	0.0000	9	0.0000
10	0.0000	10	0.0000	10	0.0000	10	0.0000

(a) N = Number of spills.
P(N) = Probability of the indicated number of spills occurring.

TABLE 4.g-4

SUMMARY OF STATISTICALLY EXPECTED SPILLS
LOMPOC OPTION

Project Element	Statistically Expected Spills >10 bbl	>100 bbl	>1000 bbl	>10,000 bbl
Platform	0.188	0.110	0.074	0.039
Emulsion Pipeline	0.161	0.014	0.001	0.000
Total	0.349	0.123	0.076	0.039

TABLE 4.g-5

PROBABILITY OF SPILL OCCURRENCE VERSUS SPILL VOLUME
FOR INDIVIDUAL PROJECT ELEMENTS
LOMPOC OPTION

	V > 10 bbl[(a)]			V > 100 bbl		
	P(0 Spill)	P(1 Spill)	P(>1 Spill)	P(0 Spill)	P(1 Spill)	P(>1 Spill)
Platform	0.83	0.16	0.02	0.90	0.10	0.01
Emulsion Pipeline	0.85	0.14	0.01	0.99	0.01	0.00

	V > 1000 bbl			V > 10,000 bbl		
	P(0 Spill)	P(1 Spill)	P(>1 Spill)	P(0 Spill)	P(1 Spill)	P(>1 Spill)
Platform	0.93	0.07	0.00	0.96	0.04	0.00
Emulsion Pipeline	1.00	0.00	0.00	1.00	0.00	0.00

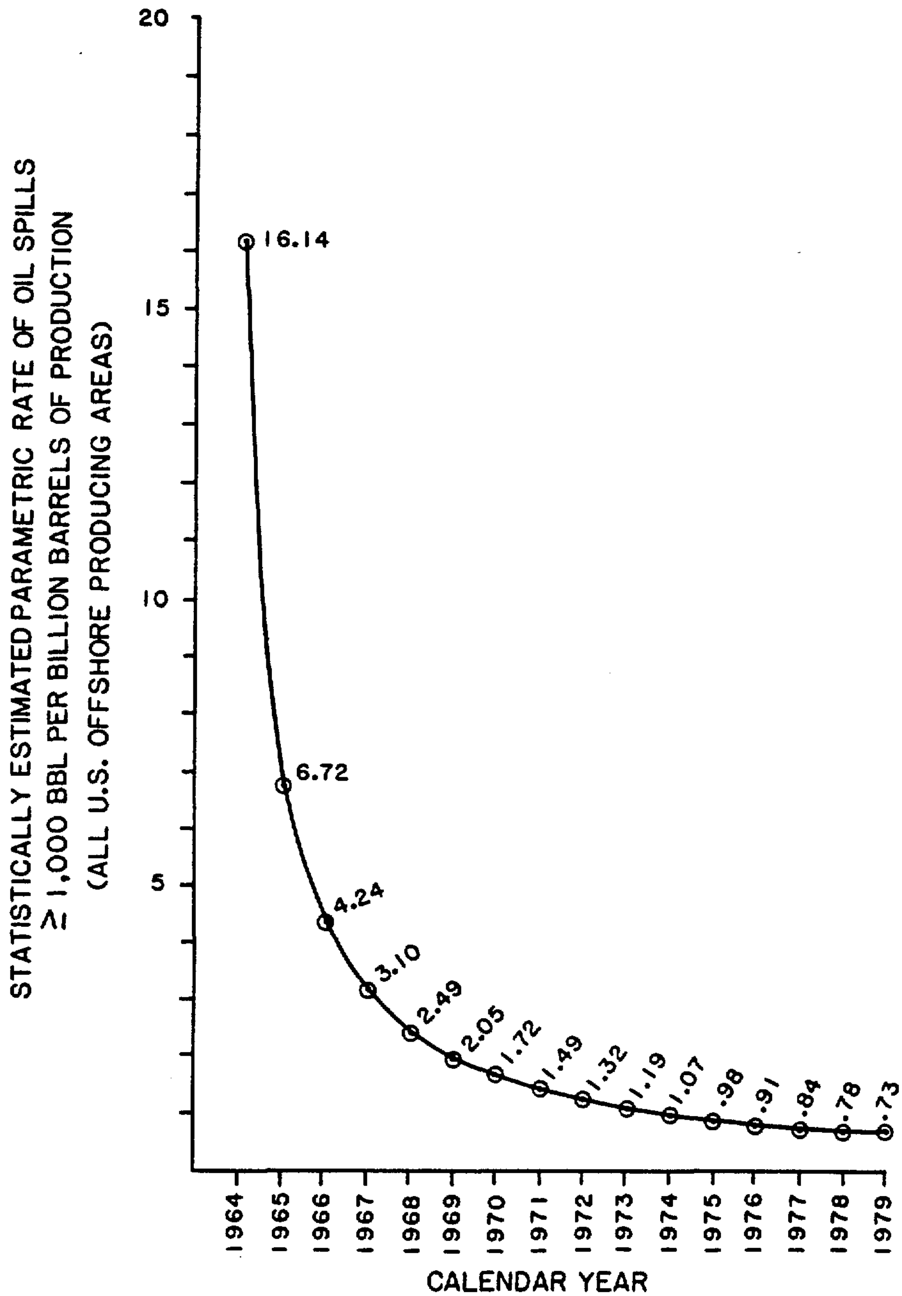
(a) V = Volume.
P = Probability (of the indicated number of spills occurring).

TABLE 4.g-6

TOTAL OIL SPILL PROBABILITY - LOMPOC OPTION

>10 bbl[a]		>100 bbl		>1000 bbl		>10,000 bbl	
N	P(N)	N	P(N)	N	P(N)	N	P(N)
0	0.7055	0	0.8839	0	0.9271	0	0.9495
1	0.2461	1	0.1091	1	0.0701	1	0.0492
2	0.0429	2	0.0067	2	0.0027	2	0.0013
3	0.0050	3	0.0003	3	0.0001	3	0.0000
4	0.0004	4	0.0000	4	0.0000	4	0.0000
5	0.0000	5	0.0000	5	0.0000	5	0.0000
6	0.0000	6	0.0000	6	0.0000	6	0.0000
7	0.0000	7	0.0000	7	0.0000	7	0.0000
8	0.0000	8	0.0000	8	0.0000	8	0.0000
9	0.0000	9	0.0000	9	0.0000	9	0.0000
10	0.0000	10	0.0000	10	0.0000	10	0.0000

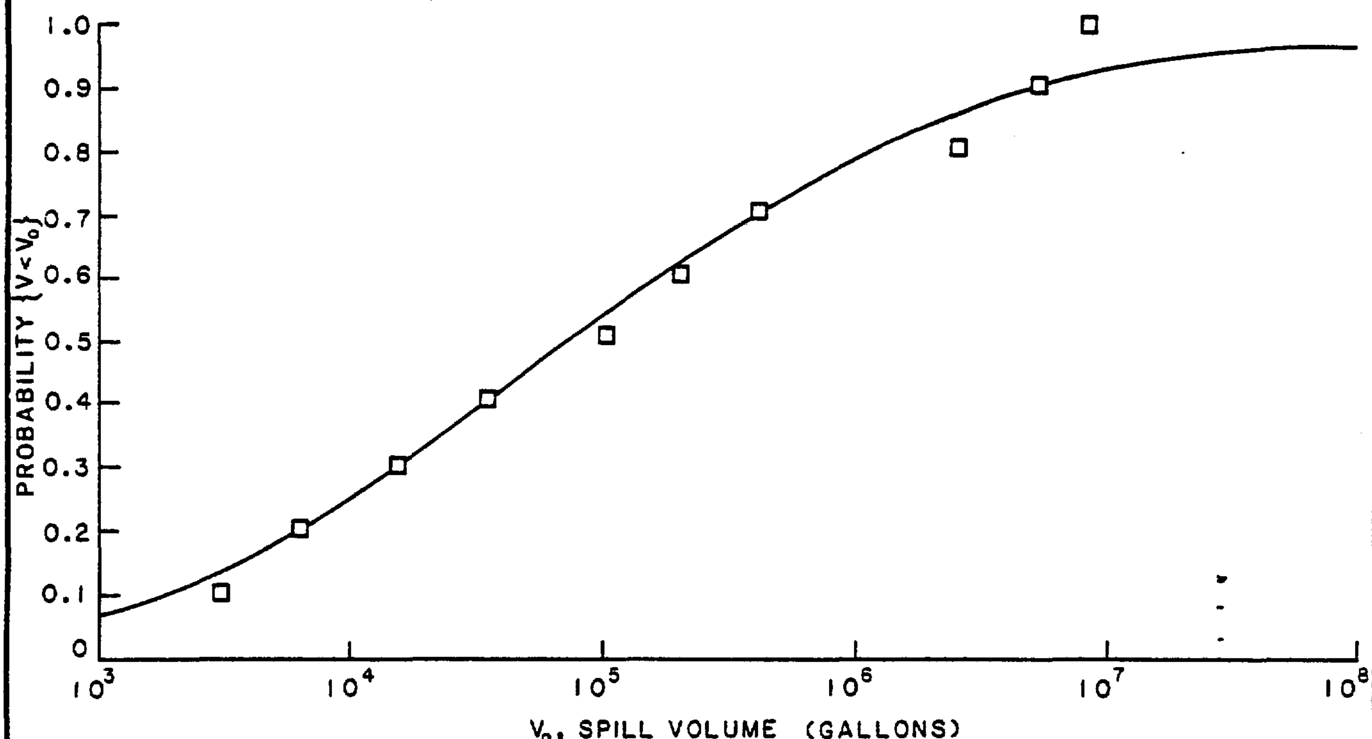
(a) N = Number of spills.
P(N) = Probability of the indicated number of spills occurring.



DATA PLOTTED FROM NAKASSIS, 1982.

FIGURE 4.g-2

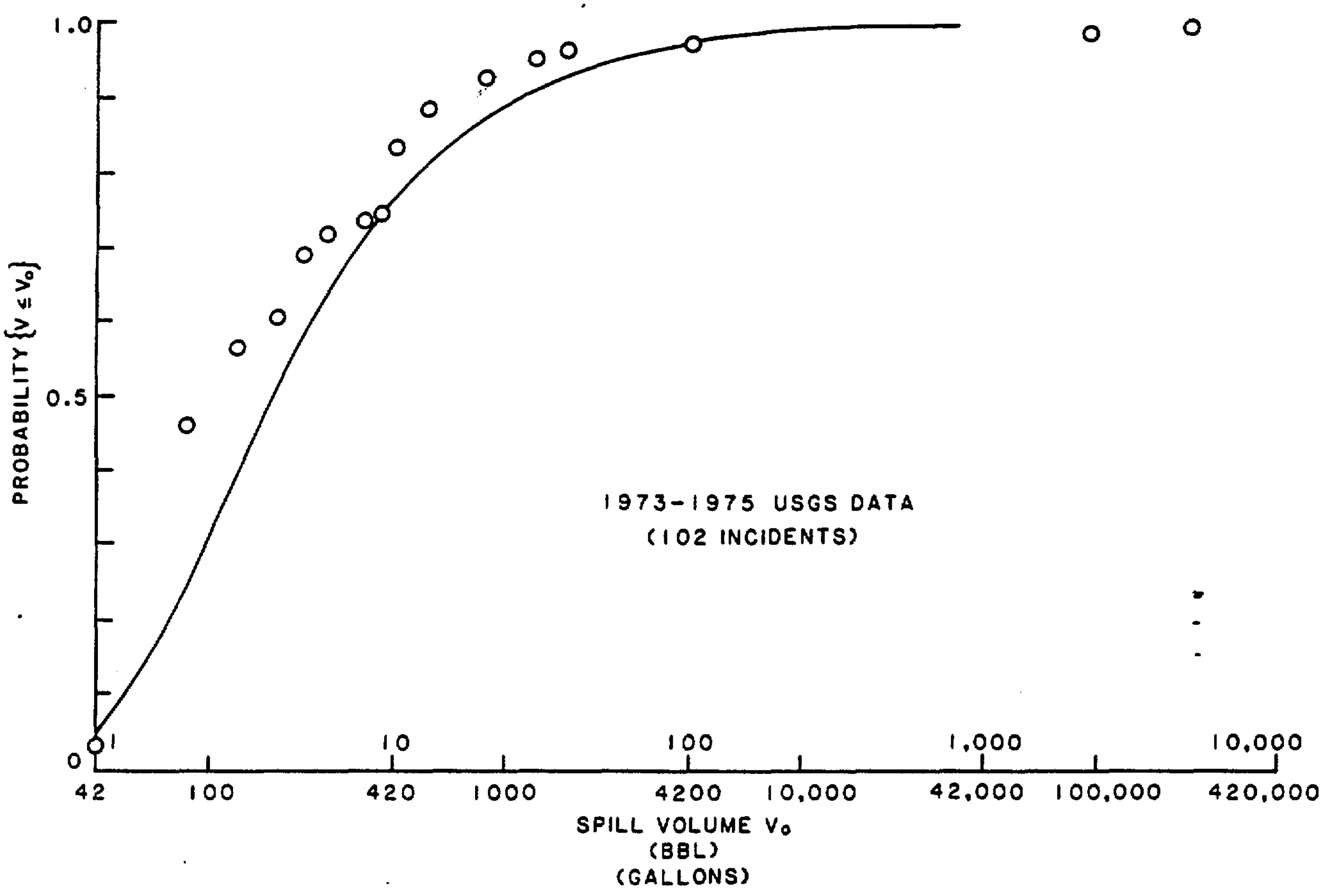
ESTIMATED PARAMETRIC RATE OF OCCURRENCE OF OIL SPILLS LARGER THAN 1,000 BARRELS BY YEAR, 1964 THROUGH 1979



DATA FROM STEWART AND KENNEDY (1978).

FIGURE 4.g-3

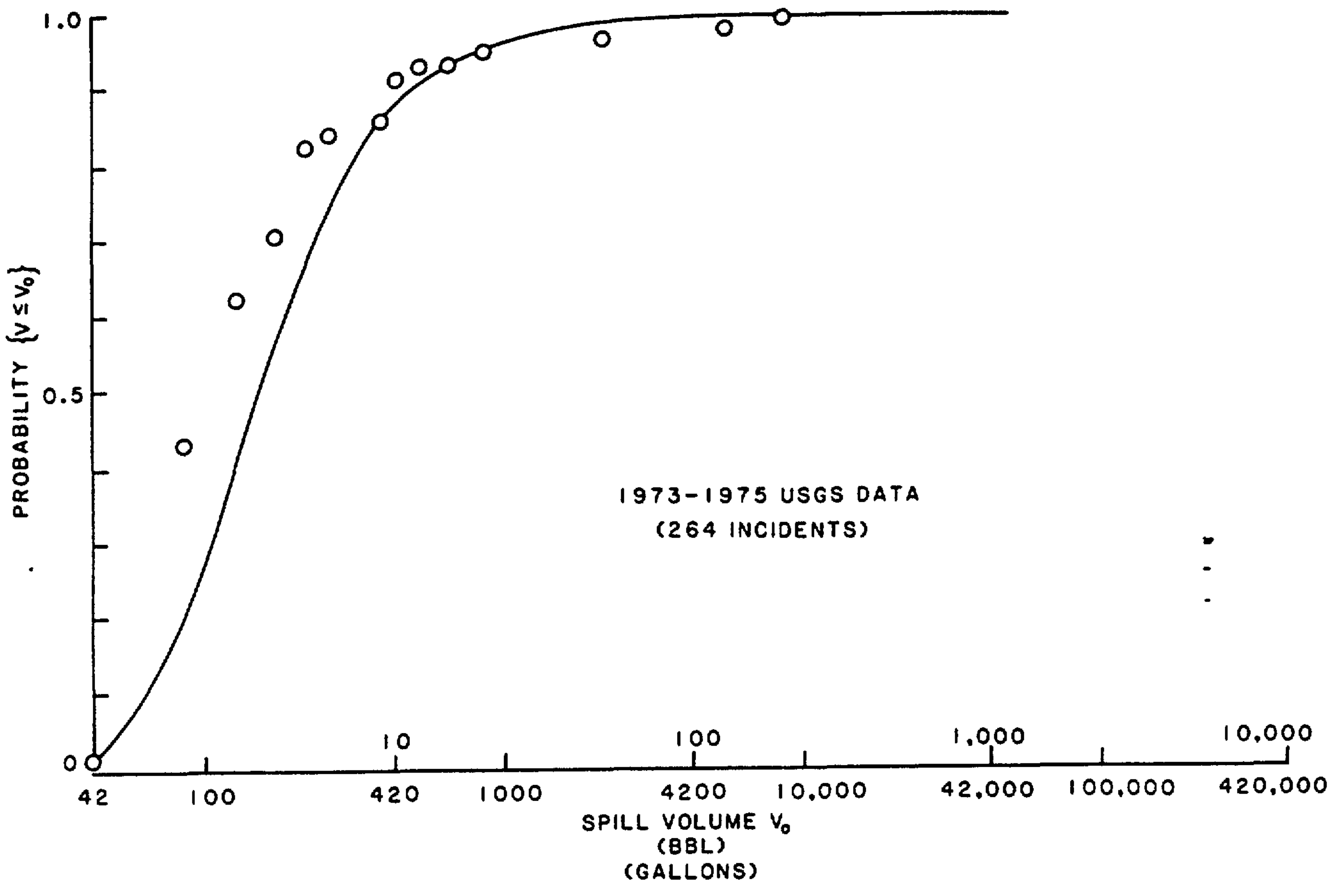
CUMULATIVE SPILL VOLUME DISTRIBUTION FOR PLATFORM BLOWOUTS



DATA FROM STEWART AND KENNEDY (1978).

FIGURE 4.g-4

CUMULATIVE SPILL VOLUME DISTRIBUTION FOR OFFSHORE PIPELINES



DATA FROM STEWART AND KENNEDY (1978).

FIGURE 4.g-5

CUMULATIVE SPILL VOLUME DISTRIBUTION FOR NON-BLOWOUT PLATFORM SPILLS

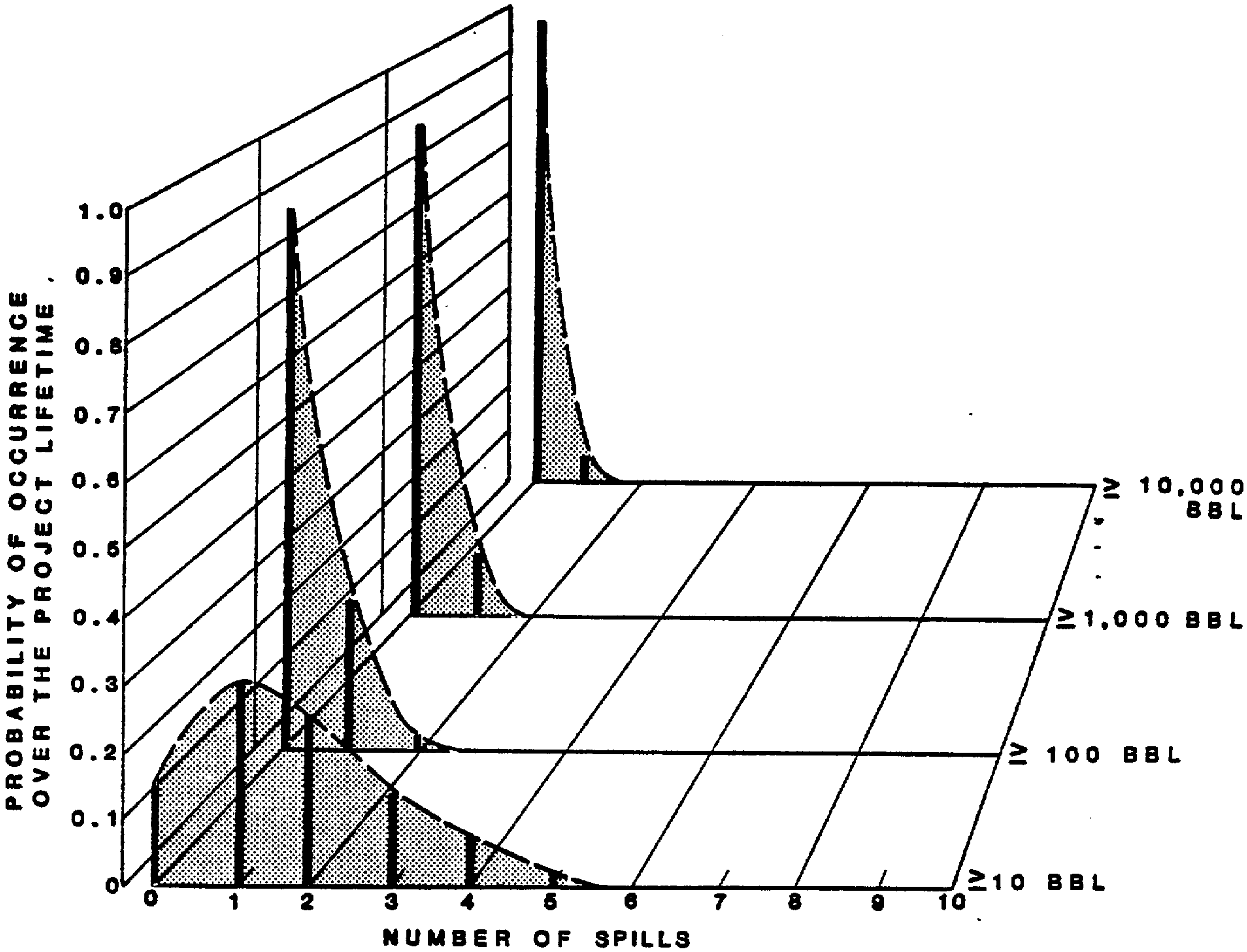


FIGURE 4.g-6

GAVIOTA OPTION, PREDICTED OIL SPILL PROBABILITY DISTRIBUTION AS A FUNCTION OF SPILL SIZE

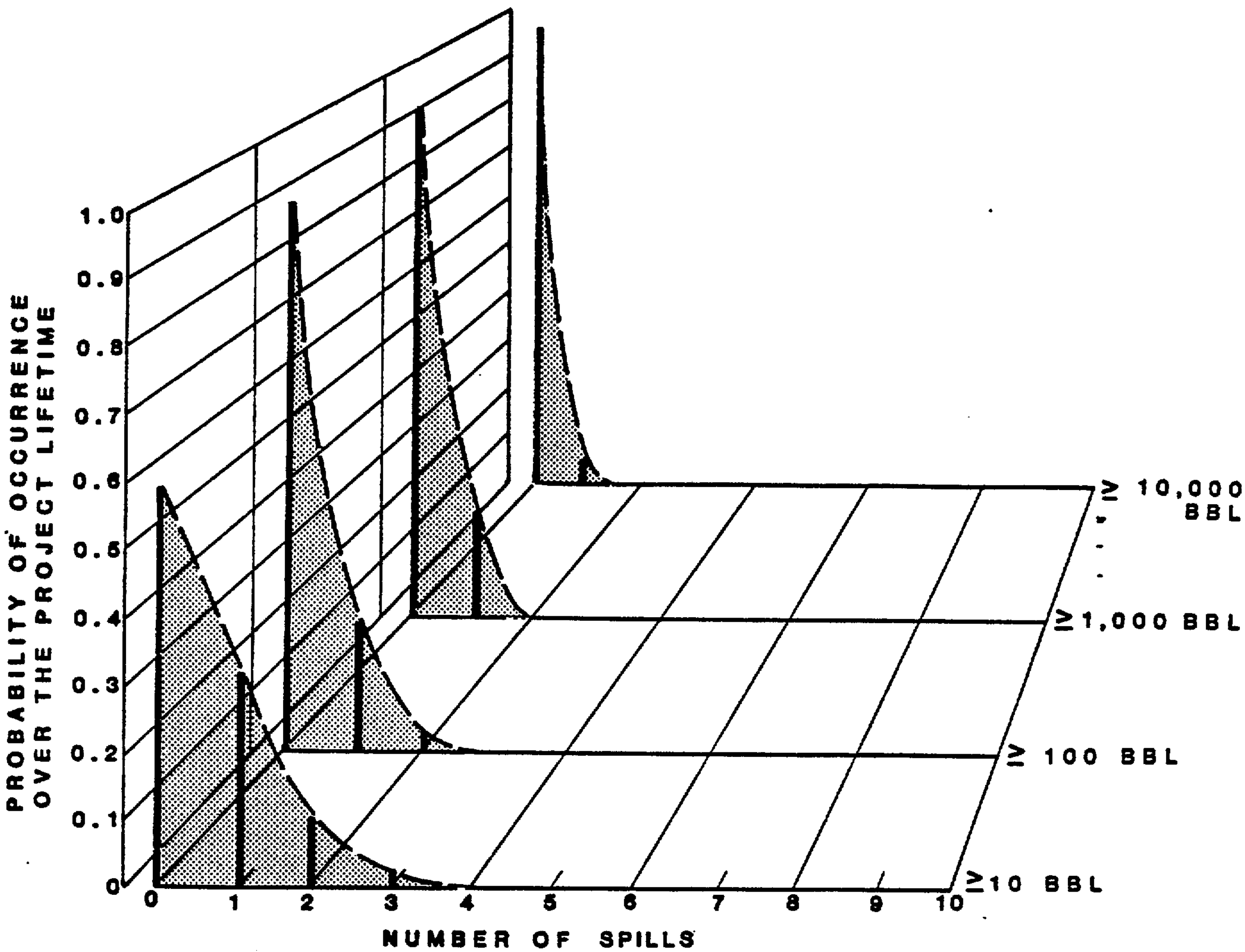


FIGURE 4.g-7

LOMPOC OPTION, PREDICTED OIL SPILL PROBABILITY DISTRIBUTION AS A FUNCTION OF SPILL SIZE

11. TRAJECTORY ANALYSIS

4.g.2 Oil Spill Trajectory Analysis

Although the potential for a large oil spill occurring as a result of Exxon's Shamrock Project is quite low (see Section 4.g.1.b), such an event could occur. To aid in assessing potential environmental impacts, a set of month-by-month oil spill trajectories was generated by computer-modeling. These trajectories provide information about the movement of a theorized spill under different sets of meteorologic and oceanographic conditions. Such information is useful in evaluating the locations of marine or coastal resources which could be impacted by a large spill, as well as the degree to which these resources could be affected (see Section 4.g.3 for discussions of such impacts).

4.g.2.a Trajectory Model Description

A trajectory model is used to simulate the movement of the centroid of an oil spill with the objective of identifying the area(s) of shoreline which it could affect, and to estimate the time for the oil slick to reach the impact point. The predominant driving forces in the model are geostrophic currents, tidal currents, and winds. Trajectory results are not dependent on oil spill volumes or mass-dependent effects (e.g., spreading, evaporation, dissolution, dispersion, emulsification, sedimentation, biodegradation, and autooxidation). However, because interpretation of the model results becomes increasingly difficult with increasing spill volumes (and associated greater spreading diameters), the model is representative for spill volumes of 10,000 bbl or less.

The trajectory model involves vectoral addition of wind and current forces acting on the centroid of a two-dimensional surface oil slick. Second-order forces, such as waves and wind-wave current interaction, have much lesser effect on spill movement and, consequently, are not incorporated in the model. Similarly, physicochemical processes such as evaporation, sinking, dissolution, and emulsification are not incorporated. These assumptions produce conservative results with respect to impact probabilities.

Published results from experiments and observations concerning the effect of wind on a marine oil slick indicate that, in the absence of surface currents, the centroid of a slick moves in the direction of the wind at a velocity of about 3 percent of that of the wind (Van Dorn, 1953; Stewart, et al., 1974; Oceanographic Institute of Washington, 1977).

A surface slick on a moving stream of water in the absence of waves moves with the currents at the surface current velocity (Stolzenbach et al., 1977). For modeling purposes, the surface currents are divided into two components: a geostrophic current and a tidally induced current. During each trajectory simulation, the net geostrophic surface current component is assumed to remain constant with time, while the tidal current component is phased with the tide.

In the trajectory model, the slick centroid is calculated to move at the same instantaneous velocity as the vectoral sum of the underlying surface currents, plus 3% of the wind velocity vector. The centroidal velocity vector can be written as:

$$U_{oil} = 0.03\, U_{wind} + U_{tidal} + U_{oceanic} \qquad \text{(Equation 1)}$$

4.g.2.b Model Application

Application of the oil spill trajectory model involves superimposing a grid system on the study area to provide a basis for inputting the wind and current information. The definitions of shoreline impact locations are also based on this grid. The grid resolution of 3 miles is dictated by the: (1) combined resolution of the available environmental data; (2) magnitude of the wind and current gradients; and, (3) size of standard OCS leases.

Each trajectory is generated by using appropriate values of the wind and current data in Equation 1 over a sequence of time steps until the centroid reaches shore or the outer boundary of the grid system, or an upper limit on time is reached.

The meteorology of the Santa Maria Basin and Santa Barbara Channel region has been classified into a number of readily discernible, frequently occurring wind regimes. Each regime has a characteristic seasonal frequency of occurrence and an average and maximum duration. For each type, the generalized wind pattern can be described for certain periods of the day for each grid square. For the remainder of the 24-hour cycle, the wind pattern is described by interpolation between the known wind patterns.

During the period that a particular wind regime is in effect, its hourly wind patterns are used in sequence to move the centroid of the spill. During each season, the wind regimes themselves can also be sequenced according to the actual frequency of occurrence of each type. The frequency of occurrence of these regimes is controlled so that the actual average duration of each type is observed.

By varying the combinations of spill time, spill location, tidal currents, and environmental data, a frequency distribution is assembled from the deterministic runs to show the percentage and distribution of impact points along the shoreline. The average and minimum time for the slick centroid to reach the shore is tabulated for each shoreline grid location.

4.g.2.c Environmental Data

4.g.2.c.1 Winds

An 11-year record of daily surface wind observations and interpretations from synoptic charts was used to classify winds into general wind regimes, some with a characteristic diurnal variation (Strange, 1983; de Violini, 1974; DeMarrais et al., 1965). Four basic meteorological types, some with multiple subtypes, were distinguished for the region. The observed frequency of occurrence of each wind regime and a transition matrix (based on the observed frequency of transitions from one specific wind type to another) was determined for input to the model. Each wind regime is discussed briefly below and illustrated on Figures 4.g-8 through 4.g-15.

Seabreeze Regime

Summer A: The seabreeze or stratus flow regime (Figure 4.g-8) is characterized by coastal fog and stratus clouds. Winds in the outer region typically remain northwesterly throughout the day at speeds of approximately 15 knots (8 m/s). During the early morning, coastal winds are light and from the west to southwest. By mid-morning, the coastal seabreeze begins to set in, increasing coastal winds to 10 to 12 knots (5-6 m/s). Winds in the region of Point Conception increase to 20 knots (10 m/s). The wind direction remains relatively constant throughout the afternoon, but the wind speed generally decreases by late afternoon particularly in the Point Conception area. At night, the offshore wind pattern is influenced by land breezes from coastal areas.

The Summer A regime is prevalent in the Santa Barbara Channel/Santa Maria Basin region 50 to 60% of the time in the spring and summer months. The average persistence of this regime is 4 to 6 days, but it may persist for as long as 20 days before being interrupted by another weather pattern.

<u>Summer B</u>: The Summer B regime (Figure 4.g-9) is typified by light offshore northwesterly winds and much greater coastal influence. The mid-day and afternoon winds approach the coast from the southwest at 8 knots (4.3 m/s). The evening, night, and early morning coastal winds run approximately parallel to shore in a northerly direction.

The Summer B regime occurs 10 to 20% of the time in the spring and summer months and has an average persistence of 1 to 2 days.

<u>Winter</u>: Wind patterns in winter are more variable than in summer. The most common pattern is the land-sea breeze regime, a seasonal variation of the summer stratus regime. The major sea breeze is weaker and the land breeze stronger during winter. A typical representation of this regime during the daytime is shown on Figure 4.g-10. After sunset, the land breeze dominates, causing the wind to shift to the northeast in nearshore areas. Wind speeds throughout the day range from about 4 to 12 knots (2 to 6 m/s).

This flow regime occurs between 50 and 60% of the time during fall and winter. It typically persists for 3 to 6 days, but may last for as long as 25 days.

<u>Northwester</u>

<u>Local Northwest Gradient</u>: The northwester meteorological type is often marked by strong northwesterly winds in the outer region which become stronger in the vicinity of Point Conception due to a pressure system situated over that area (Figure 4.g-11). A local gradient of wind to the northwest results. The strength of the northwest wind is variable, as is the distance to which it progresses eastward during the day.

The local northwest gradient flow regime occurs between 20 and 30% of the time during the summer months and 10 to 15% of the time in the winter. The average duration in summer is 2 to 3 days with a maximum duration of 10 days. The average duration in the winter is 1 to 2 days with a maximum of 8 days.

Entire Region: This flow regime is marked by strong winds throughout the region (Figure 4.g-12). A minimum wind speed of 20 knots (10 m/s) occurs for several hours during the day (usually in the afternoon). The wind direction varies from west to northwest, with less frequent winds from northwest to north.

This flow regime occurs most frequently during the winter and spring (10 to 20% of the time). Its average duration is about 1 day and its maximum duration is about 3 days. This condition occurs 10 to 15% of the time during the summer-fall months.

Southeaster

Frontal Passage: Southeasters that influence the project region are associated with migrating low pressure systems and a frontal passage. The strongest winds may occur long before the frontal passage and extend over a considerable period of time or they may occur for a short time and be confined largely to the frontal zone. The diurnal influence is minimal, being offset by the large-scale synoptic features. However, frontal passages do have peak frequency of occurrence during the early morning hours and a secondary peak in the evening.

A typical frontal passage scenario affecting the Point Conception area is shown on Figure 4.g-13. The vector plots show a southerly wind setting in initially over the entire region, followed by increasing wind speeds and a southward shift of the area of influence. After the frontal passage, light, west to southwest winds occur for about 12 to 24 hours, followed thereafter by a northwester or calm conditions.

The duration of the southeaster is dependent on the speed of the migrating pressure system, but is generally about 2 days. The frequency of occurrence of the southeast regime is generally in the range of 10 to 20% from November to April. These conditions are rare during the other months of the year (less than 3%).

Entire Region: Southeast winds are often associated with migratory low pressure systems prior to the frontal passage. This regime occurs between 1 and 5% of the time from November to April, and rarely during the other months. Wind speeds attained in the Point Conception area as a consequence of this regime usually range between 15 and 20 knots (8 to 10 m/s) (Figure 4.g-14).

This flow regime may result from a storm that has no effect on the eastern Santa Barbara Channel or from a front that eventually moves eastward, accompanied by southeast winds. The average duration is 1 day in the winter, with a maximum duration of about 3 days.

Northeaster/Santa Ana

The northeaster flow regime (Figure 4.g-15) is a winter condition occurring from 5 to 10% of the time between November and February. The flow regime is marked by strong (15 to 20 knots; 8 to 10 m/s) southward flows during the night and early morning hours. During the afternoon and evening, the nearshore flows moderate to 10 knots (5 m/s), while the offshore flows remain constant at 20 knots (10 m/s). The average persistence of this regime is 1 day, except during January when the average persistence is 2 days.

The Santa Ana is a dry, offshore wind associated with high pressure over the western states. It usually establishes itself between about 0300 and 0900 hours as a northeast wind in the Oxnard area confined to the southeastern end of the Santa Barbara Channel and along the Channel Islands. It often remains throughout the day, although a westerly seabreeze sometimes appears in the afternoon hours during weak to moderate Santa Ana conditions. Wind speeds may reach 28 knots (14 m/s) or more during the morning hours in the offshore area between Oxnard and Anacapa Island. During the afternoon hours, when the northeast winds are countered by the westerly seabreeze, speeds of about 14 knots (7 m/s) are not uncommon in this area.

Santa Anas typically do not extend into the western part of the Channel or into the Santa Maria Basin. However, on rare occasions, a severe Santa Ana with winds reaching 50 to 60 knots (26 to 31 m/s) in the eastern Channel will occur. Usually, the duration of such an event is 2 days, with Santa Ana winds in the western Channel/Point Conception area only occurring on the second day. The frequency of the Santa Ana-Entire Channel regime during November to March was between 0 and 1.98% during the 11-year study period.

4.g.2.c.2 Currents

Surface Currents

The surface currents in the Point Conception area form a complex pattern of large-scale horizontal circulations and eddies, all of which are subject to seasonal and meteorological effects. The dominant influence in the region is the southward-flowing California Current. As the current passes the eastward break in the coastline at Point Conception, a permanent counterclockwise eddy, the Southern California Counter Current, is induced. The current usually flows west- and northward through the Santa Barbara Channel (Dailey et al., 1974; Jones, 1971; Wyllie, 1966). Seasonal variations in meteorology modify the current pattern.

Pirie et al. (1975) have identified three periods of current patterns from LANDSAT and NASA high altitude air photographs. The Oceanic Period, occurring from July to November, corresponds to the situation described in the preceding paragraph. During the so-called Davidson Period from November to mid-February, the normally submerged Davidson Current rises as the California Current weakens. This produces a more northward flow along the entire coast. In between these two periods, strong winds dominate over the geostrophic effects. The surface wind shear induces vertical circulation characteristic of the Upwelling Period. Pirie et al. (1975) show current patterns typifying these three periods for the entire California coast.

Considering the various sources of surface current data presently available, surface current patterns of Pirie et al. (1975) and Kolpack (1971) were selected for use in the oil spill trajectory model. As additional input to the trajectory model in the Santa Maria region, the monthly surface currents provided by Williams et al. (1981) were used. Examples of surface currents used in the model for the Oceanic, Davidson, and Upwelling periods are shown on Figure 4.g-16.

Current speeds in the Santa Maria Basin and Santa Barbara Channel region are highly variable. Typical current speeds are 0.3 knot (0.15 m/s) in deep water and 0.2 knot (0.1 m/s) near shore (City of Oxnard and USGS, 1980); however, extreme conditions from nearly calm to double the preceding values have been recorded (Schwartzlose, 1963). The trajectory model incorporates the typical values.

Tidal Currents

In the Point Conception region, the tides are predominantly semi-diurnal with the tide peak moving in a northwesterly direction along the coast. The current velocities are greatest during the mid-tide period with zero velocities at high and low water.

An average maximum tidal current of 0.2 knot (0.10 m/s) occurs during the mid-tide period (NOAA, 1982; Dailey et al., 1974). The current is assumed to have this value for water depths from the shoreline to a depth of 90 feet (27 m). Current velocities are then assumed to decrease linearly to a value of zero at a depth of 300 feet (91 m).

4.g.2.d Results

Month-by-month oil spill trajectory analyses were carried out for two oil spill release locations: the site of the proposed platform on Lease P-0440 and a point halfway along the Gaviota Option pipeline corridor from the platform to the vicinity of the proposed Platform Hermosa site on Lease P-0316. Trajectory analyses were not carried out for the Shamrock to Platform Irene pipeline corridor for two reasons:

(1) The midpoint of the pipeline corridor is only 1.1 miles (1.8 km) from the Shamrock platform site. This is a very short distance with respect to the resolution of the model and, consequently, trajectories from the pipeline midpoint would be essentially the same as those from the platform site.

(2) Trajectory analyses for Platform Irene are available as part of Union's DPP submittal. The Platform Irene site is only 2.2 miles (3.5 km) from the Shamrock platform site and 1.1 miles from the pipeline corridor midpoint.

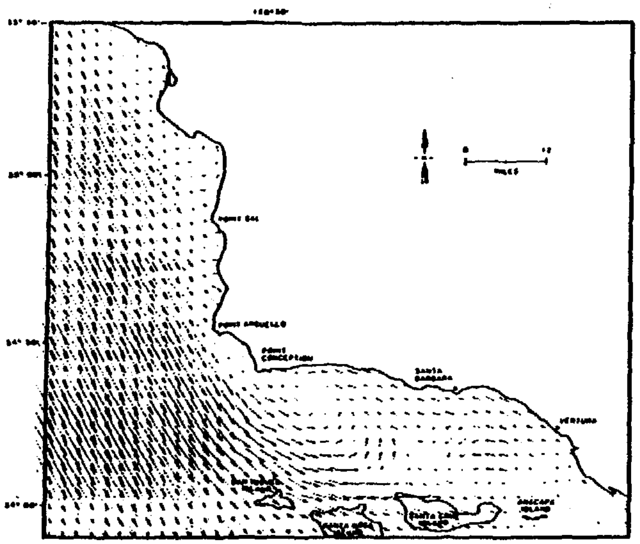
At each release site, 200 trajectories were initiated per month for a total of 2400 trajectories per site per year. For each trajectory, the starting wind type, time of day, and duration are determined by entering the monthly frequency and duration tables with uniformly distributed random numbers. The starting tidal current phase and hence velocity and direction, is also selected by a random number. The surface current pattern to be used is determined by month. The transition between wind types during a trajectory is determined by entering a monthly transition matrix of wind type changes, again using a random number. All the wind tables were assembled from the 11 years of data collected as described previously. The trajectories were run until either a land or water boundary was contacted or 72 hours passed.

The results of the oil spill trajectory analysis for the platform release site are shown on Figures 4.g-17 through 4.g-28. The pipeline corridor release point results are shown on Figures 4.g-29 through 4.g-40. On each figure, a trajectory of a spill arriving at the shore segment with the greatest impact percentage and taking the medium time is shown. The dots mark the spill location at 2-hour intervals. The average and minimum times to shore contact are in hours. Also shown on each figure is the percentage of all trajectories which remain at sea after 72 hours.

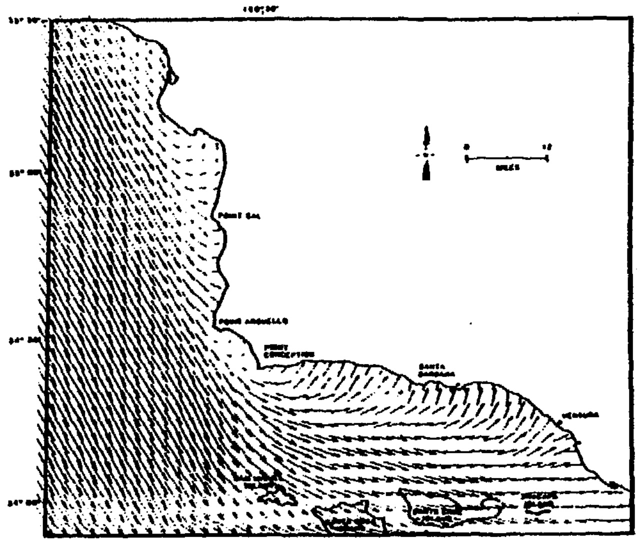
The dotted lines bordering the trajectory centerlines indicate the predicted width of the oil slick caused by spreading. The Fay/Hoult spreading algorithm (Fay, 1971) used here calculates the plume diameter as a function of the oil characteristics, volume spilled, and time. The oil characteristics used, primarily density, viscosity, and surface tension, are typical of the crude in this region. For the platform release a spill volume of 10,000 barrels (bbl) was assumed. This volume marks the upper limit for which the assumptions of trajectory modeling are valid. The oil pipeline release was assumed to be 1000 bbl.

The results indicate that for both release sites the greatest percentage of trajectories remain at sea in the Santa Barbara Channel after 72 hours. This is due to the predominance of northwesterly winds in the release site region. Averaged annually the trajectory results translate to a 11.1% probability of a spill from the proposed platform reaching the shoreline. The monthly probabilities range from 6% in May to 23.5% in January with a minimum time of 14 hours to shoreline contact. The results for the pipeline release are similar with an annual average of 11.8% probability of shoreline contact ranging from 5% in October to 19.5% in February. The minimum time to shoreline contact from the midpoint pipeline location is 11 hours.

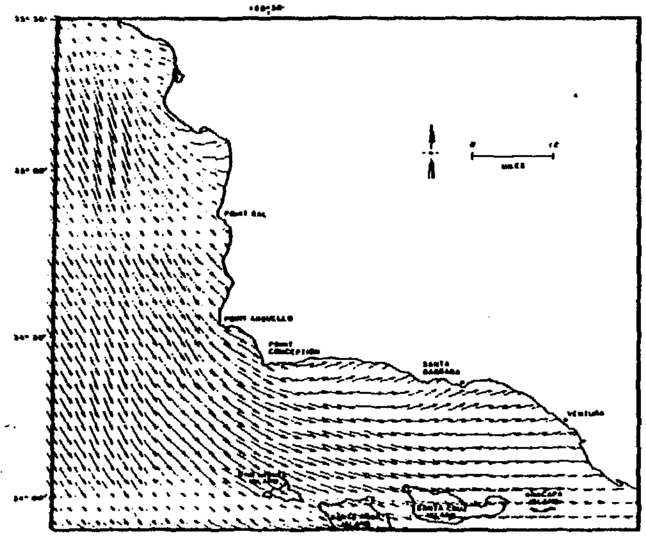
The results show a pronounced seasonal variation associated with the seasonal variation in severe storms. In the summer months the only trajectories which contact land are those occurring during the strong northwesterly storms. In the winter, the more northerly shoreline contacts are due to the greater percentage of storms with southeasterly winds.



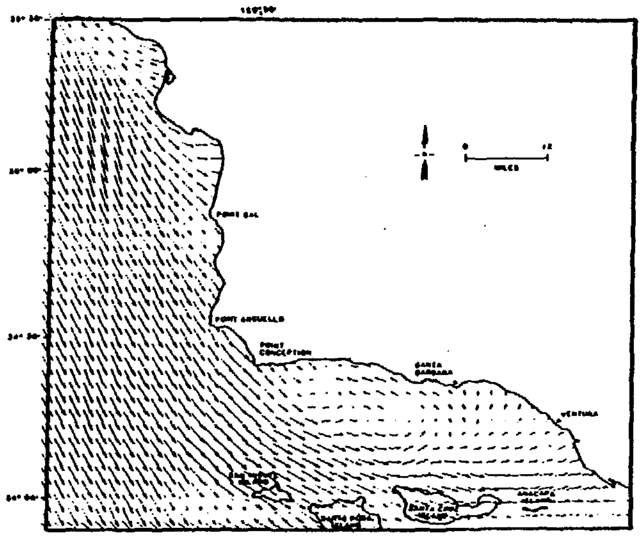
SEA BREEZE SUMMER SANTA MARIA + SANTA BARBARA 0200 - 0800 HRS. → 12 KNOTS



SEA BREEZE SUMMER "A" 1000 HRS → 12 KNOTS



SEA BREEZE SUMMER "A" 1400 HRS → 20 KNOTS

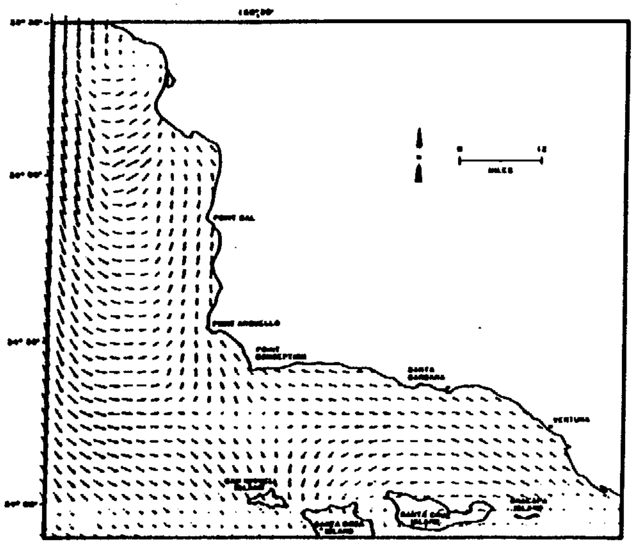


SEA BREEZE SUMMER "A" 2100 HRS → 20 KNOTS

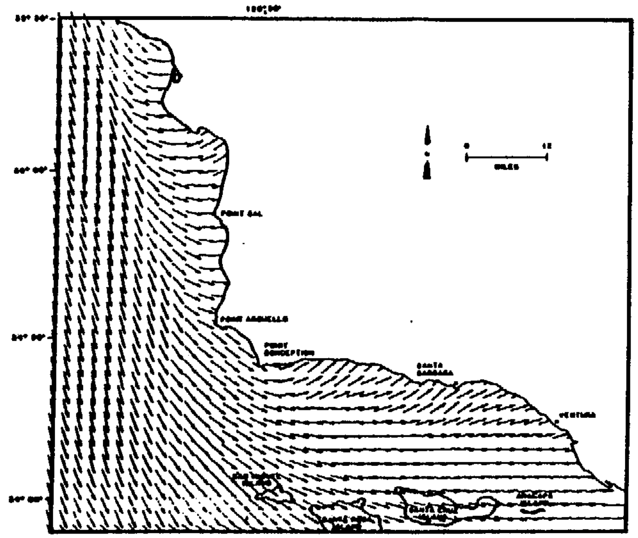
FIGURE 4.g-8

SUMMER A SEABREEZE WIND REGIME

SOURCE: STRANGE, 1981.



SEA BREEZE SUMMER "B" 2000 - 0800 HRS → 20 KNOTS

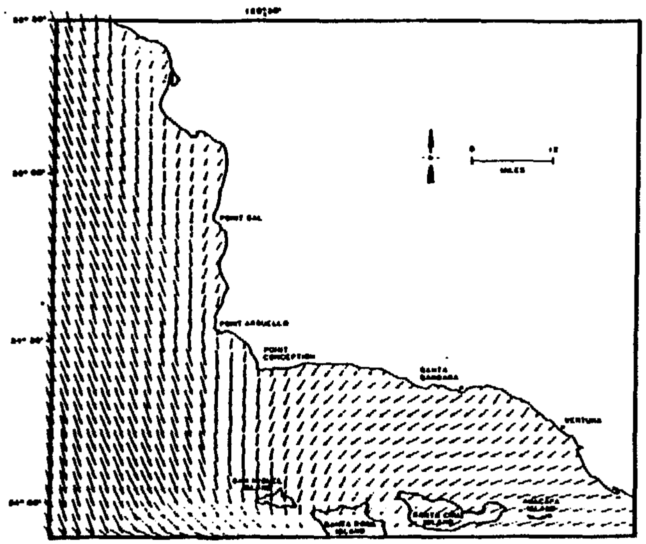


SEA BREEZE SUMMER "B" 1400 HRS → 20 KNOTS

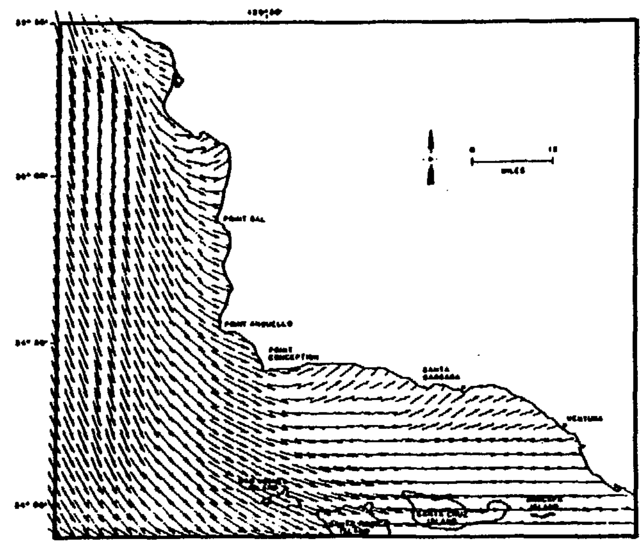
FIGURE 4.g-9

SUMMER B SEABREEZE
WIND REGIME

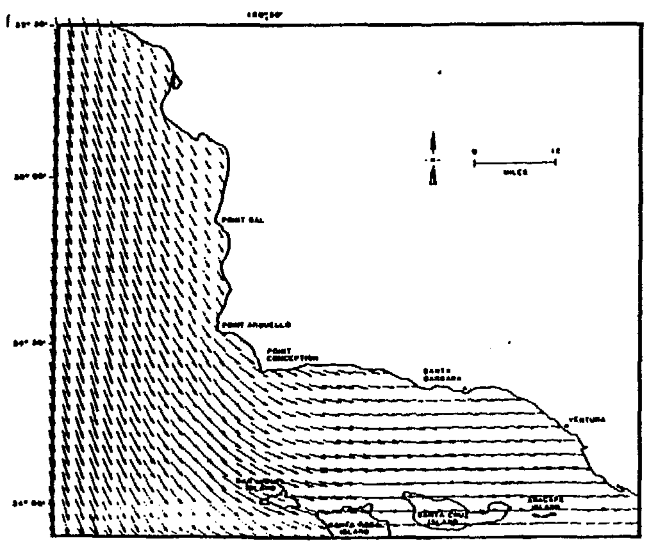
SOURCE: STRANGE, 1



SEA BREEZE WINTER 0200 - 0800 HRS — 20 KNOTS



SEA BREEZE WINTER 1400 HRS — 20 KNOTS

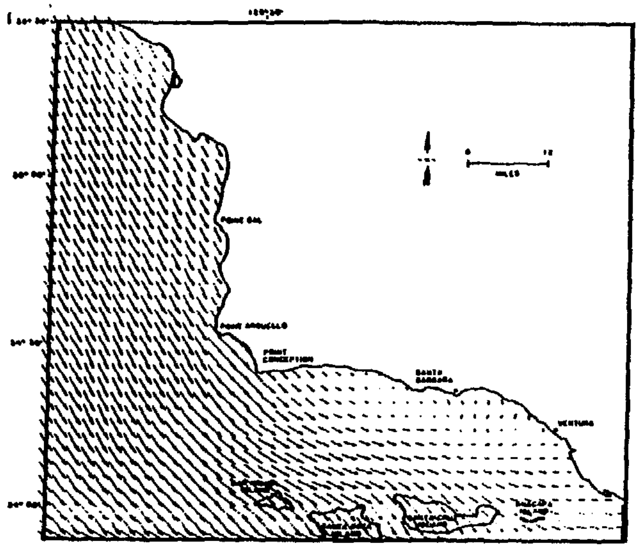


SEA BREEZE WINTER 2000 HRS — 20 KNOTS

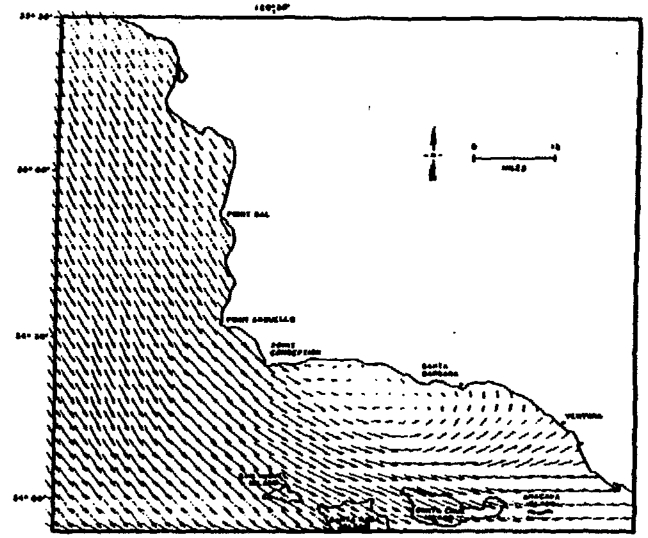
FIGURE 4.g-10

WINTER SEABREEZE
WIND REGIME

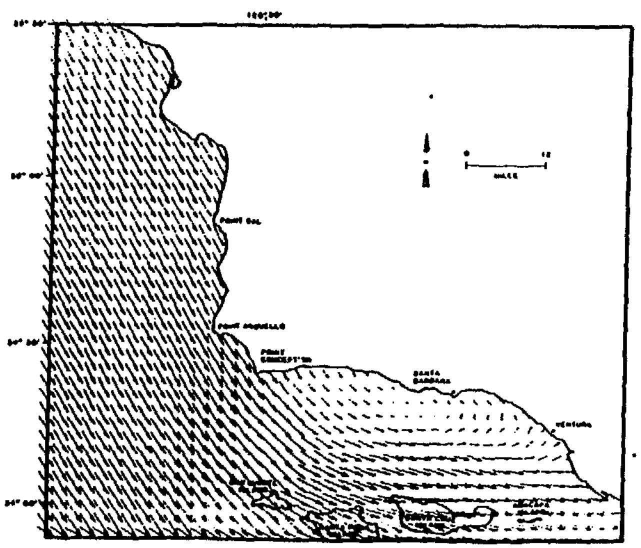
SOURCE: STRANGE, 1981.



LOCAL NW GRADIENT 0800 HRS → 30 KNOTS



LOCAL NW GRADIENT 1400 HRS → 30 KNOTS

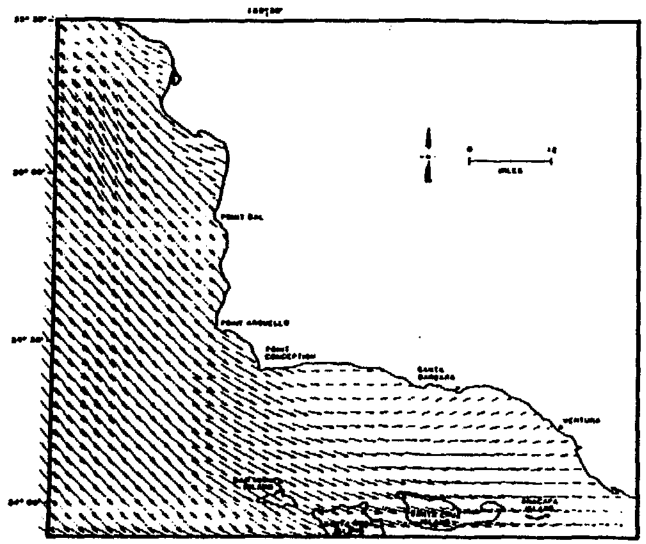


LOCAL NW GRADIENT 2000 - 0200 HRS → 30 KNOTS

FIGURE 4.g-11

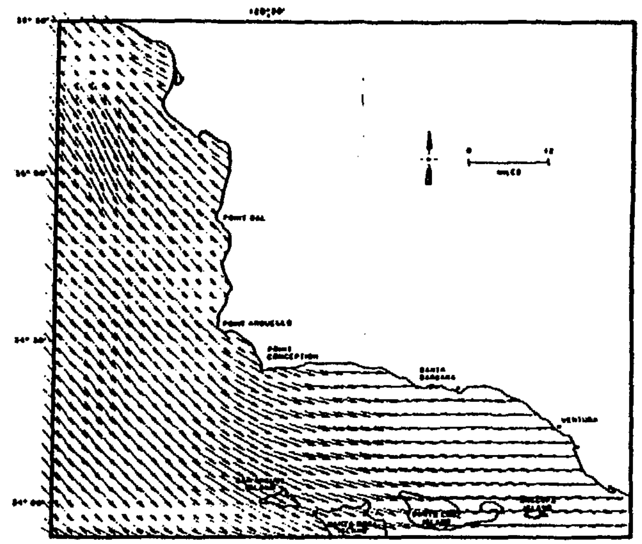
LOCAL NORTHWEST GRADIENT WIND REGIME

SOURCE: STRANGE, 1981.



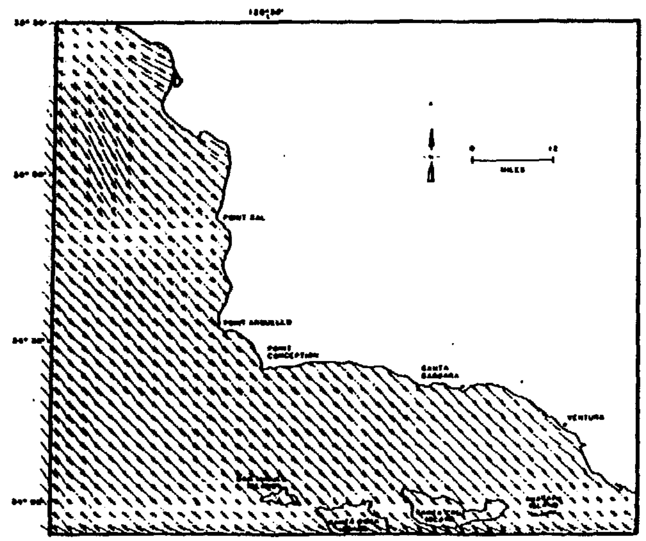
NORTHWESTER 0200 - 0800 HRS

→ 30 KNOTS



NORTHWESTER 1400 HRS

→ 30 KNOTS



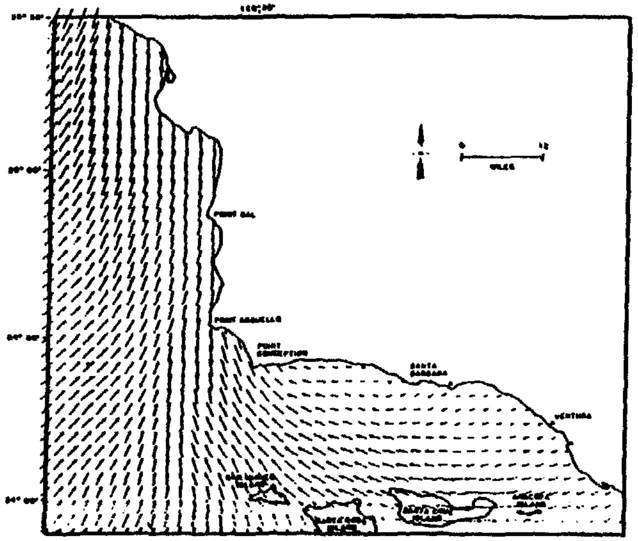
NORTHWESTER 2000 HRS

→ 30 KNOTS

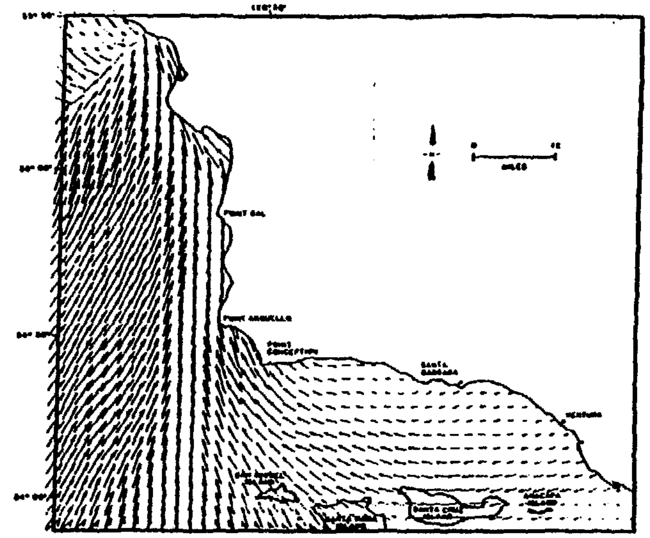
FIGURE 4.g-12

NORTHWESTER
(ENTIRE REGION)
WIND REGIME

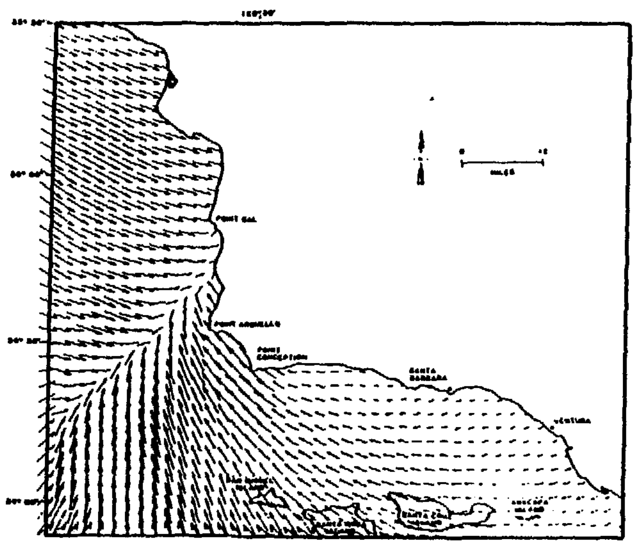
SOURCE: STRANGE, 1981.



FRONTAL PASSAGE 0000 HRS. → 60 KNOTS



FRONTAL PASSAGE 0000 + 0600 HRS. → 60 KNOTS

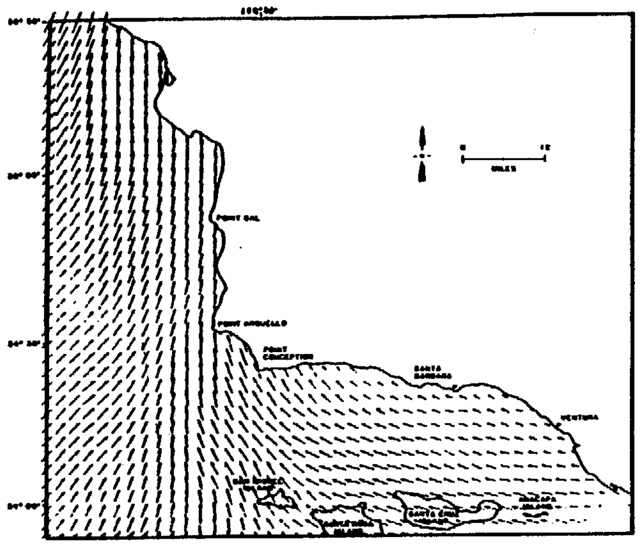


FRONTAL PASSAGE 0600 + 0800 HRS. → 60 KNOTS

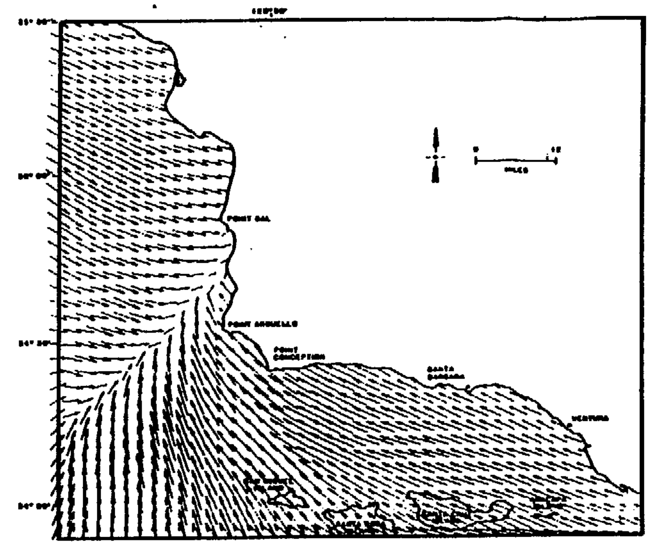
FIGURE 4.g-13

FRONTAL PASSAGE
WIND REGIME

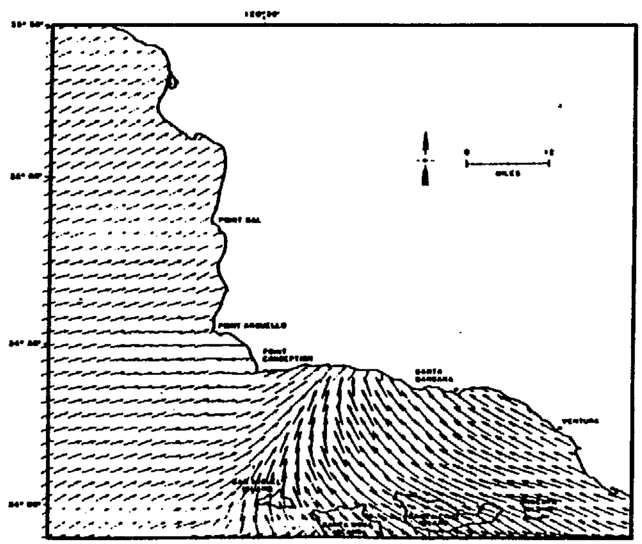
SOURCE: STRANGE, 198



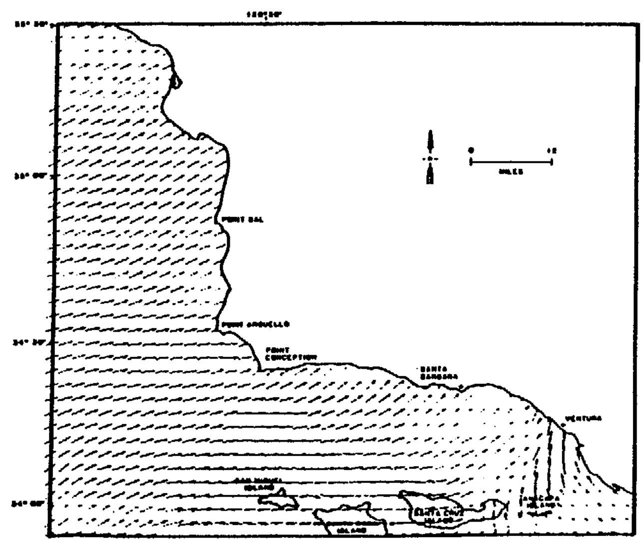
SOUTHEASTER 0 HRS → 60 KNOTS



SOUTHEASTER 0000 + 0400 HRS. → 60 KNOTS



SOUTHEASTER 0000 + 1000 HRS. → 60 KNOTS

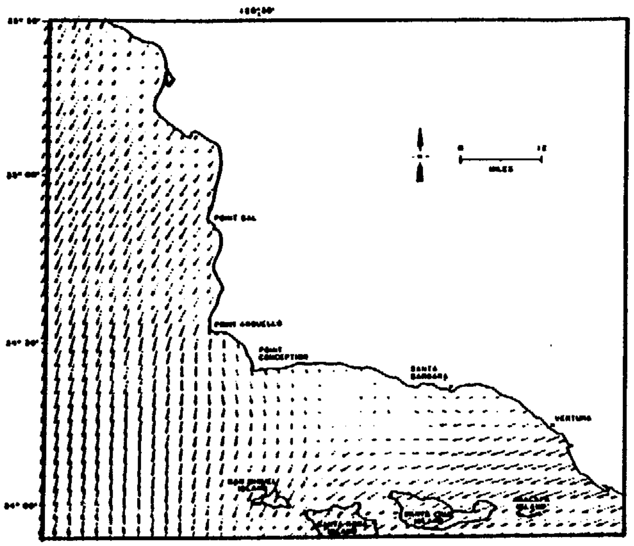


SOUTHEASTER 0000 + 1400 HRS. → 60 KNOTS

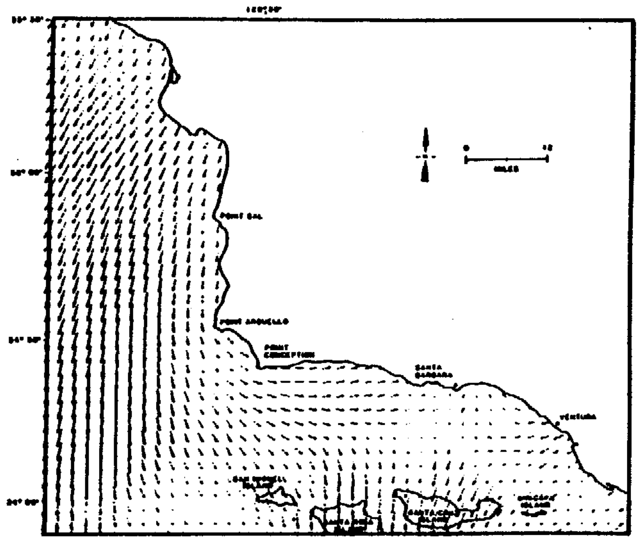
FIGURE 4.g-14

SOUTHEASTER
(ENTIRE REGION)

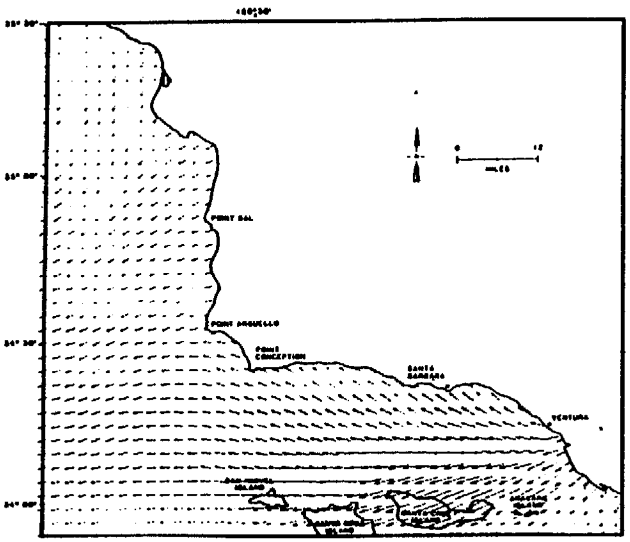
SOURCE: STRANGE, 1981.



NORTHEASTER 0200 - 0800 HRS → 60 KNOTS



NORTHEASTER 1400 HRS → 60 KNOTS

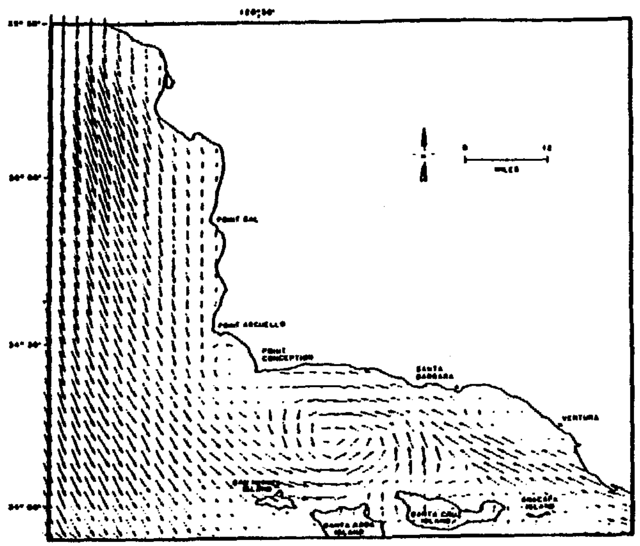


SANTA ANA → 60 KNOTS

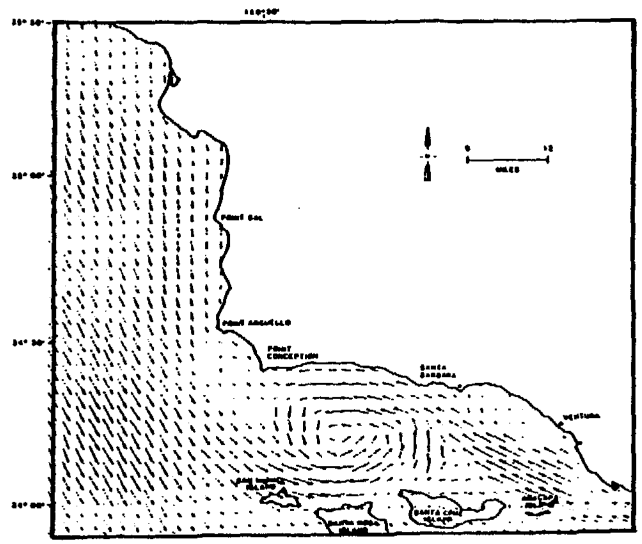
FIGURE 4.g-15

NORTHEASTER/SANTA ANA WIND REGIME

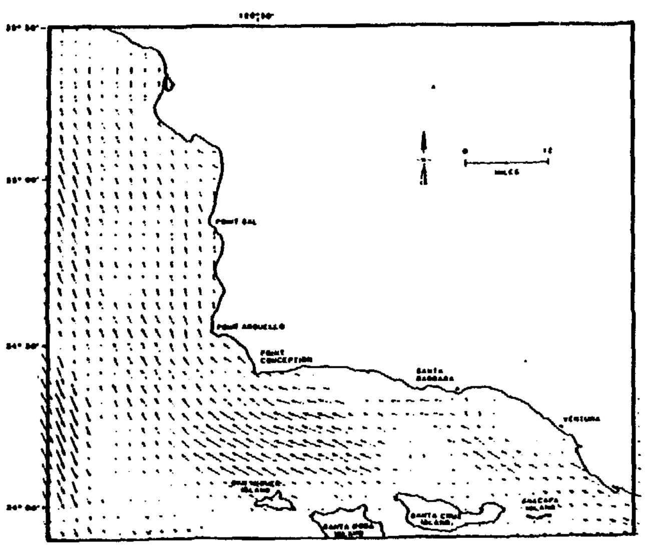
SOURCE: STRANGE, [illegible].



SURFACE CURRENTS - UPWELLING PERIOD → 0.24 KNOTS



SURFACE CURRENTS - OCEANIC PERIOD → 0.24 KNOTS



SURFACE CURRENTS - DAVIDSON PERIOD → 0.24 KNOTS

FIGURE 4.g-16

SURFACE CURRENTS

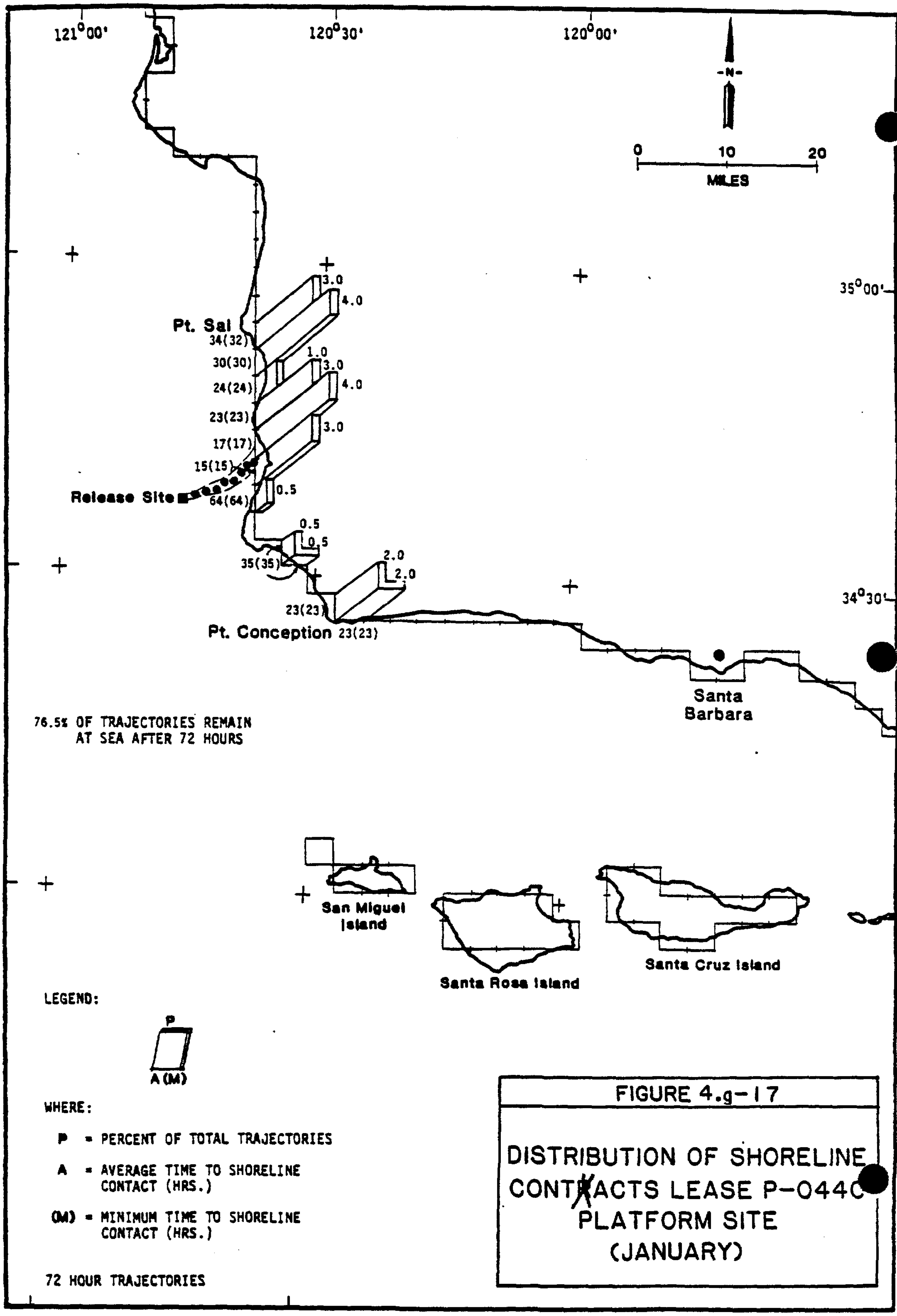


FIGURE 4.g-17

DISTRIBUTION OF SHORELINE CONT~~R~~ACTS LEASE P-0440 PLATFORM SITE (JANUARY)

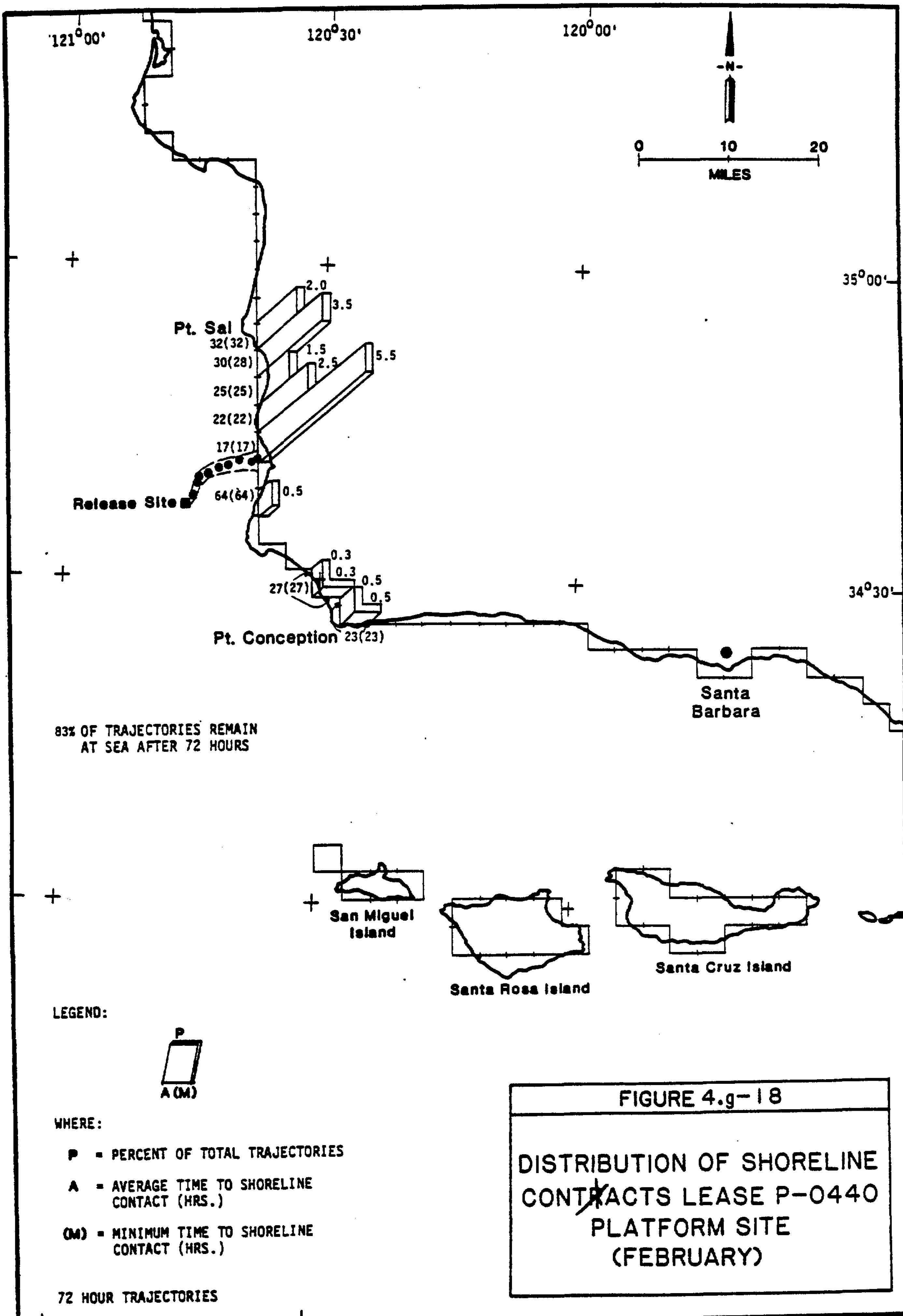


FIGURE 4.g-18

DISTRIBUTION OF SHORELINE CONT~~R~~ACTS LEASE P-0440 PLATFORM SITE (FEBRUARY)

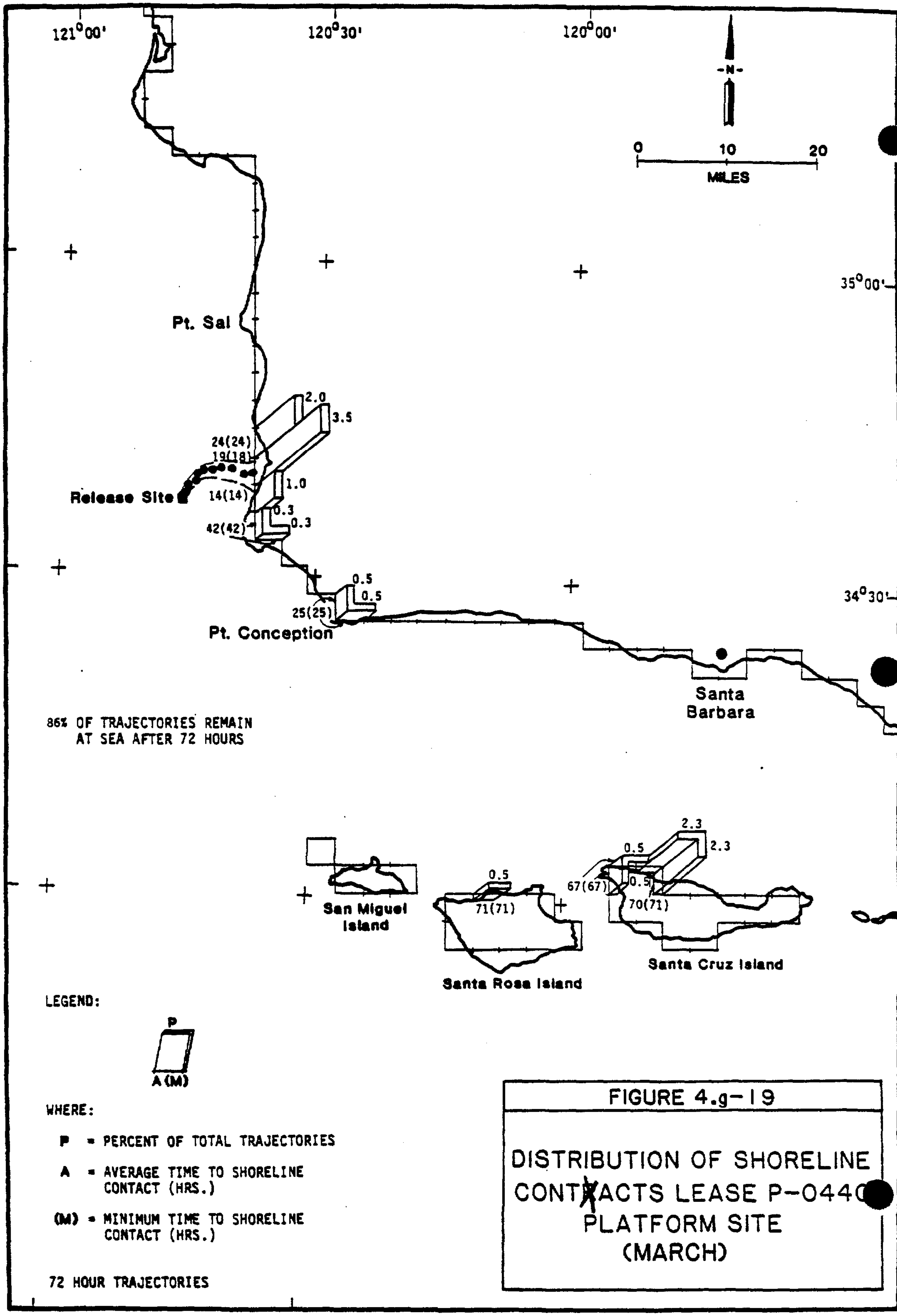


FIGURE 4.g-19

DISTRIBUTION OF SHORELINE CONT~~R~~ACTS LEASE P-0440 PLATFORM SITE (MARCH)

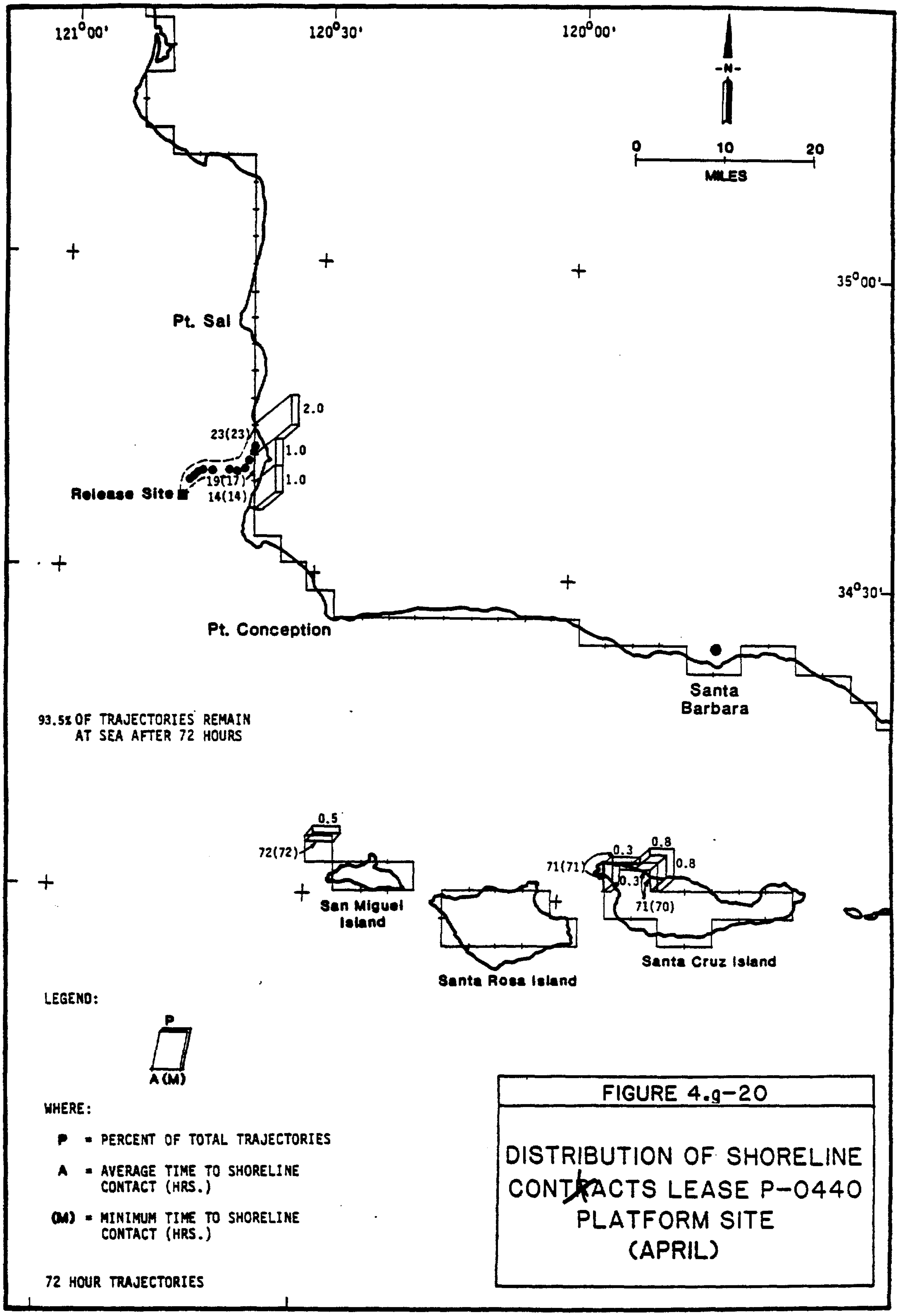


FIGURE 4.g-20

DISTRIBUTION OF SHORELINE CONT~~R~~ACTS LEASE P-0440 PLATFORM SITE (APRIL)

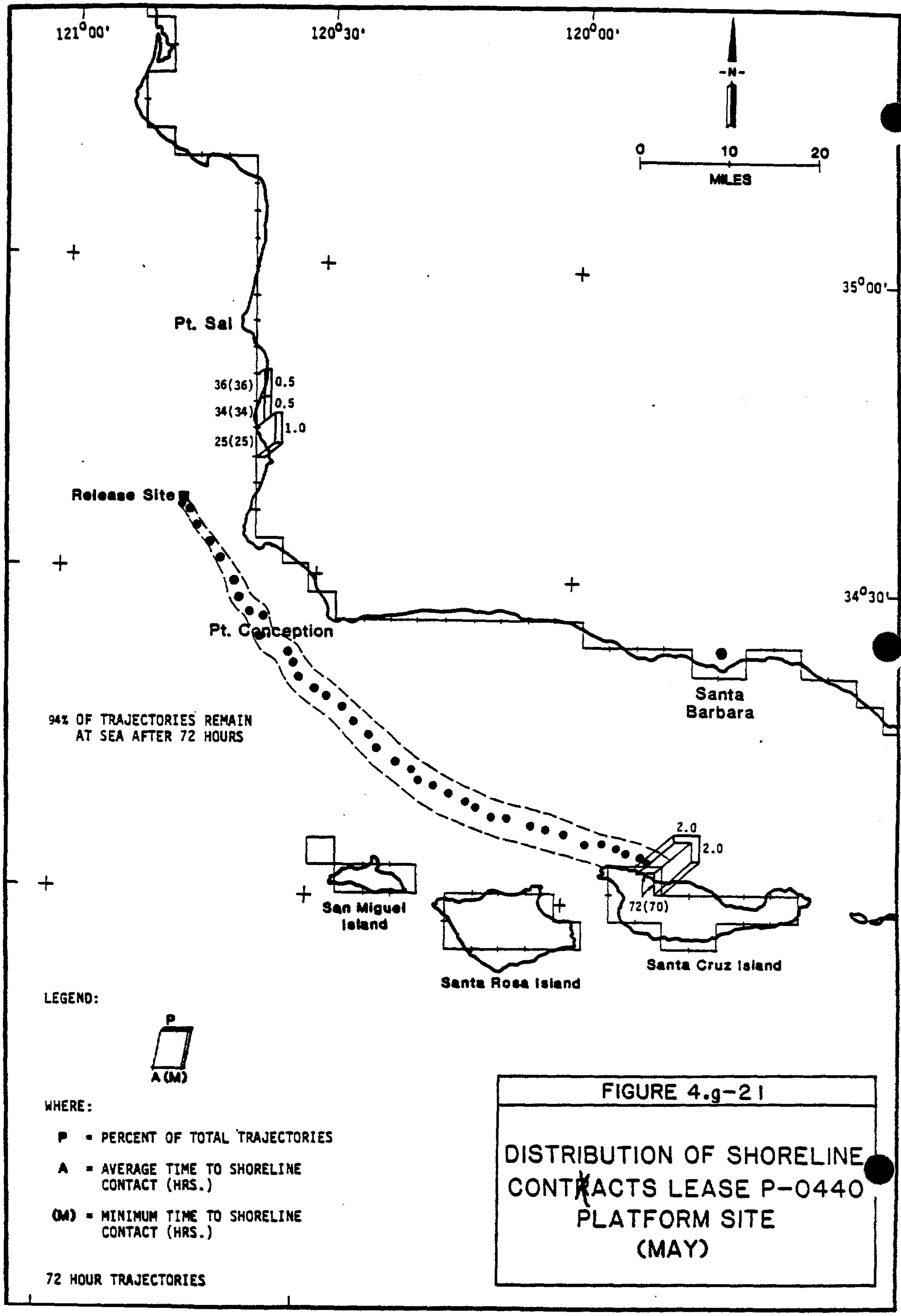
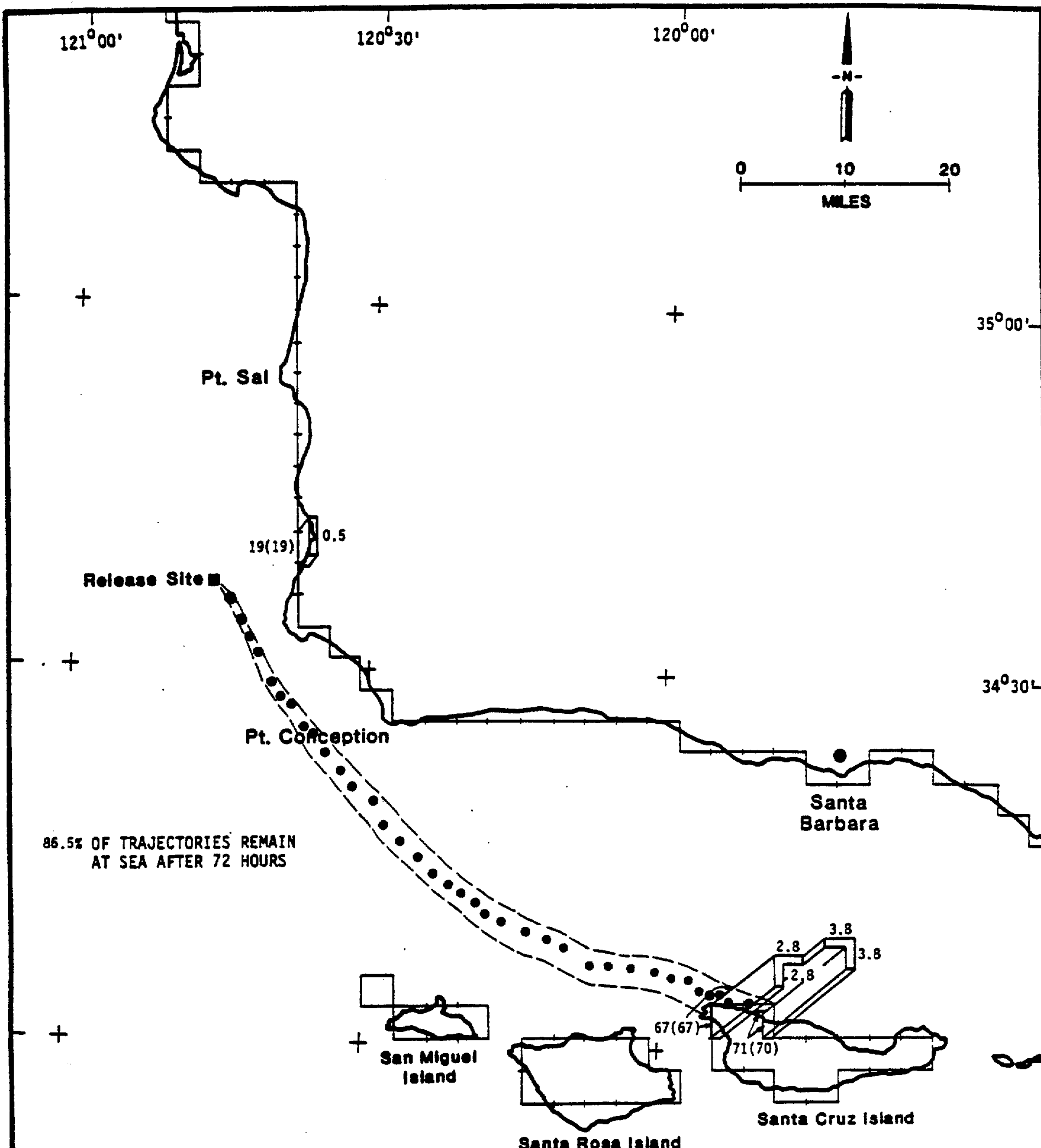


FIGURE 4.g-21

DISTRIBUTION OF SHORELINE CONTACTS LEASE P-0440 PLATFORM SITE (MAY)



LEGEND:

P

A (M)

WHERE:

P = PERCENT OF TOTAL TRAJECTORIES

A = AVERAGE TIME TO SHORELINE CONTACT (HRS.)

(M) = MINIMUM TIME TO SHORELINE CONTACT (HRS.)

72 HOUR TRAJECTORIES

FIGURE 4.g-22

DISTRIBUTION OF SHORELINE CONTRACTS LEASE P-0440 PLATFORM SITE (JUNE)

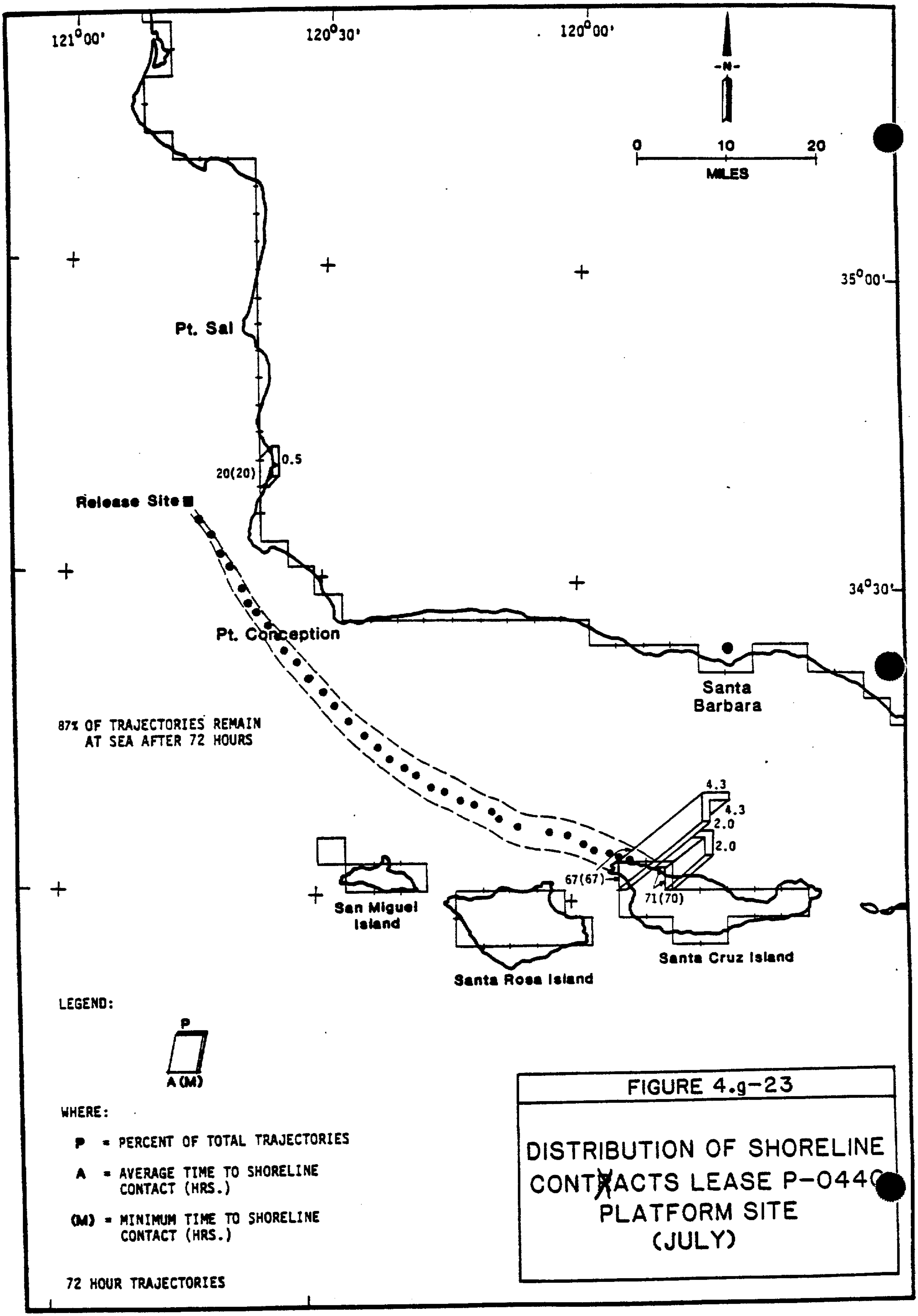
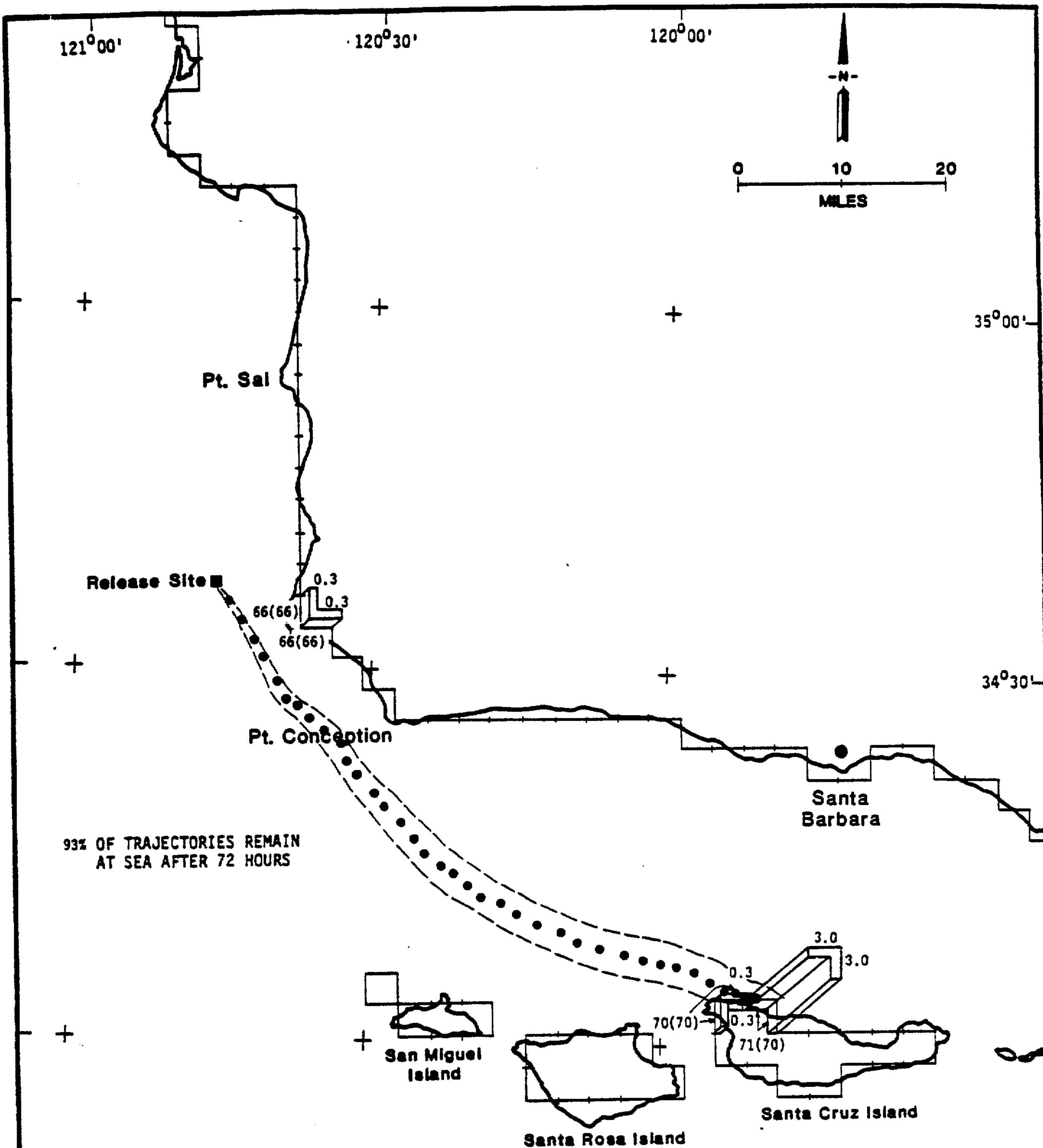


FIGURE 4.g-23

DISTRIBUTION OF SHORELINE CONT~~R~~ACTS LEASE P-044
PLATFORM SITE
(JULY)



LEGEND:

P

A (M)

WHERE:

P = PERCENT OF TOTAL TRAJECTORIES

A = AVERAGE TIME TO SHORELINE CONTACT (HRS.)

(M) = MINIMUM TIME TO SHORELINE CONTACT (HRS.)

72 HOUR TRAJECTORIES

FIGURE 4.g-24

DISTRIBUTION OF SHORELINE CONTRACTS LEASE P-0440 PLATFORM SITE (AUGUST)

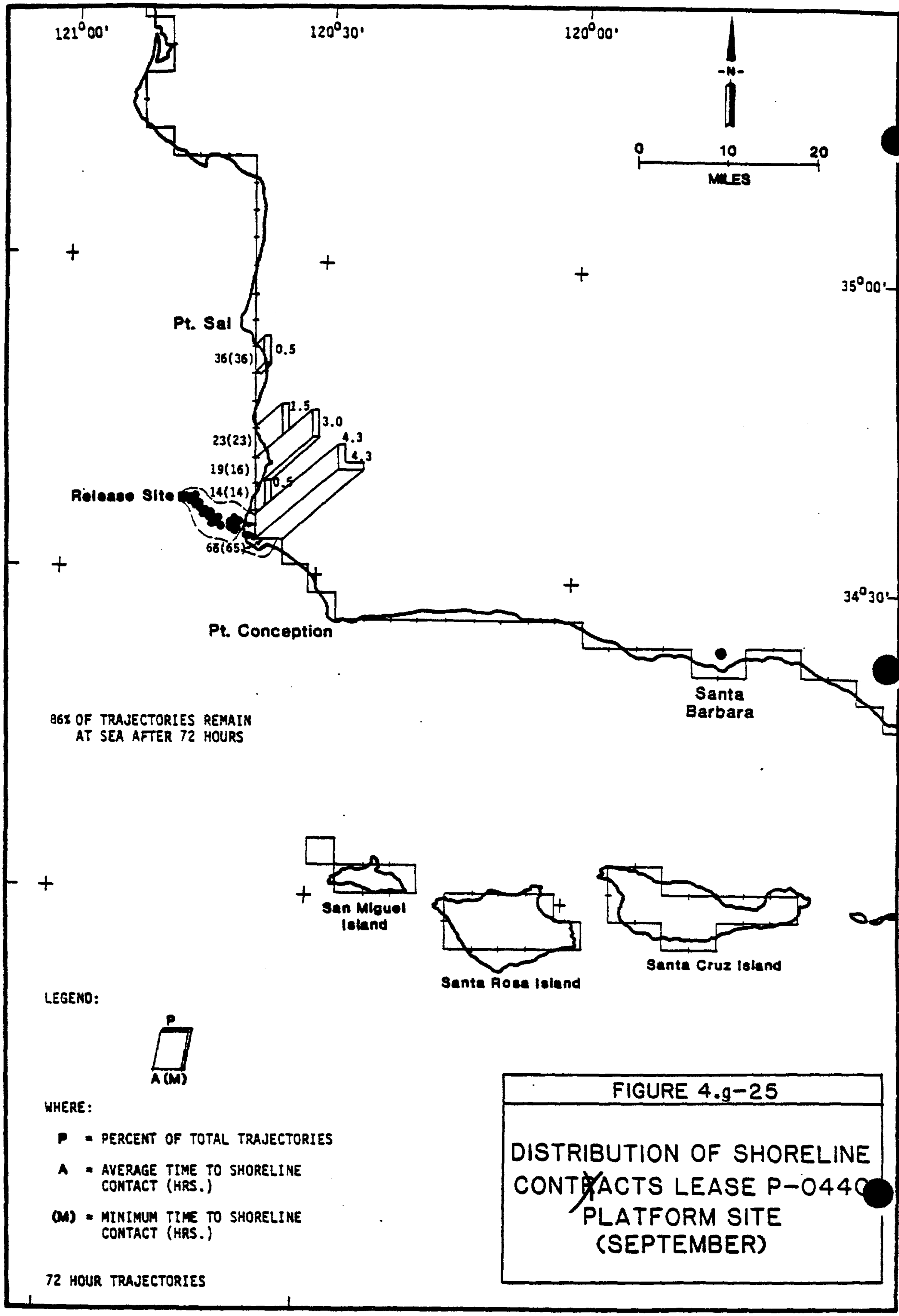


FIGURE 4.g-25

DISTRIBUTION OF SHORELINE CONTACTS LEASE P-0440 PLATFORM SITE (SEPTEMBER)

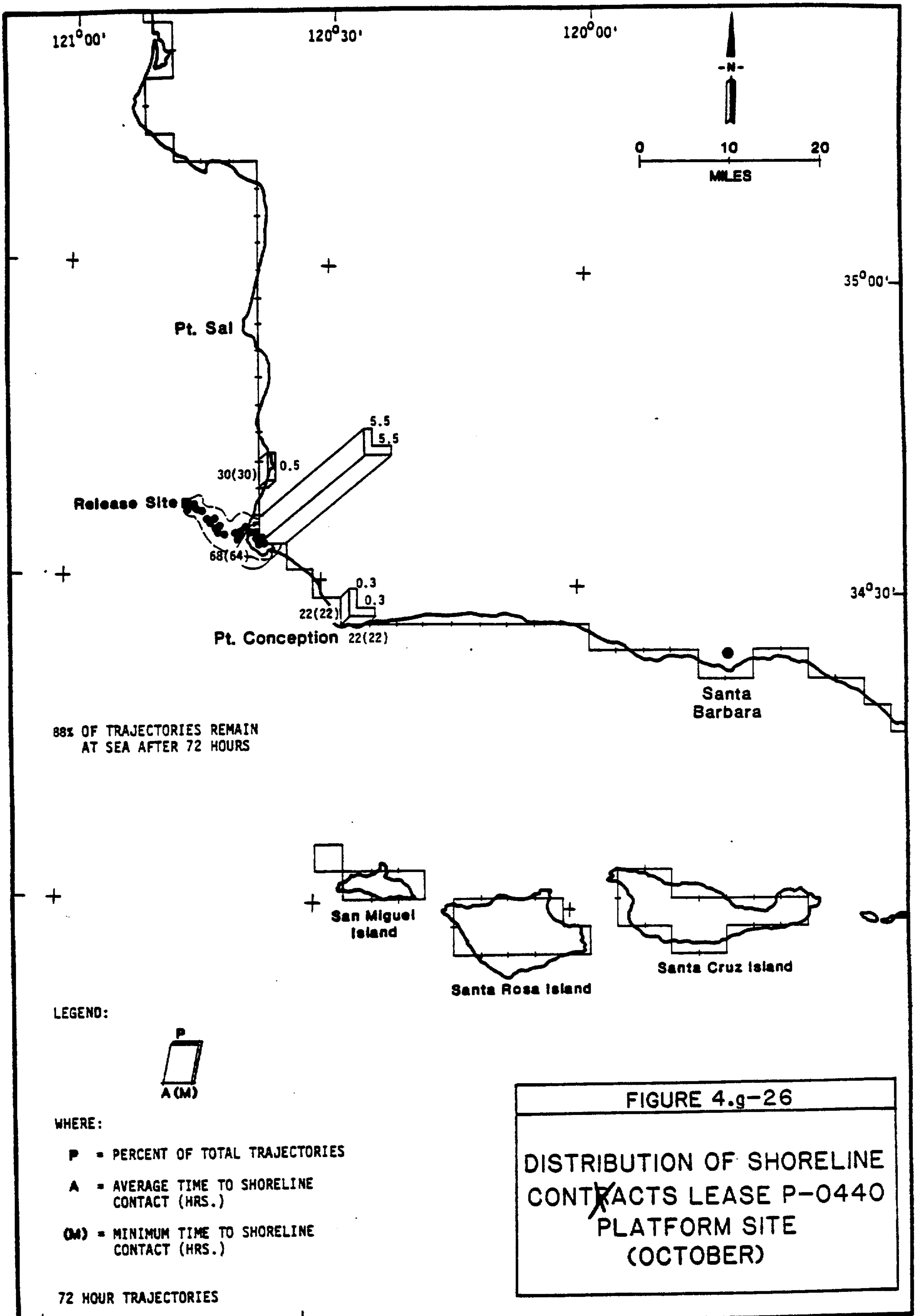


FIGURE 4.g-26

DISTRIBUTION OF SHORELINE CONTACTS LEASE P-0440 PLATFORM SITE (OCTOBER)

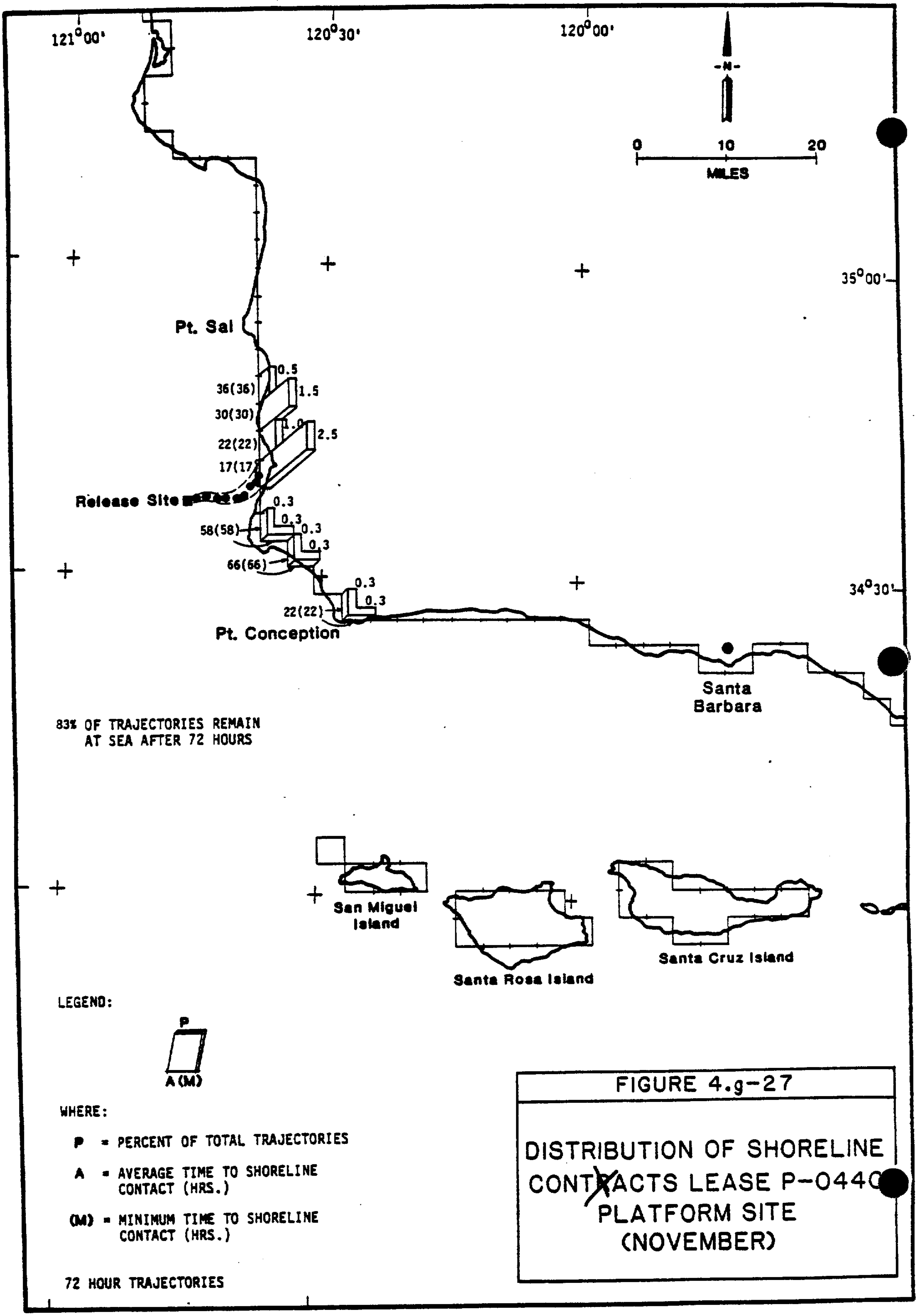
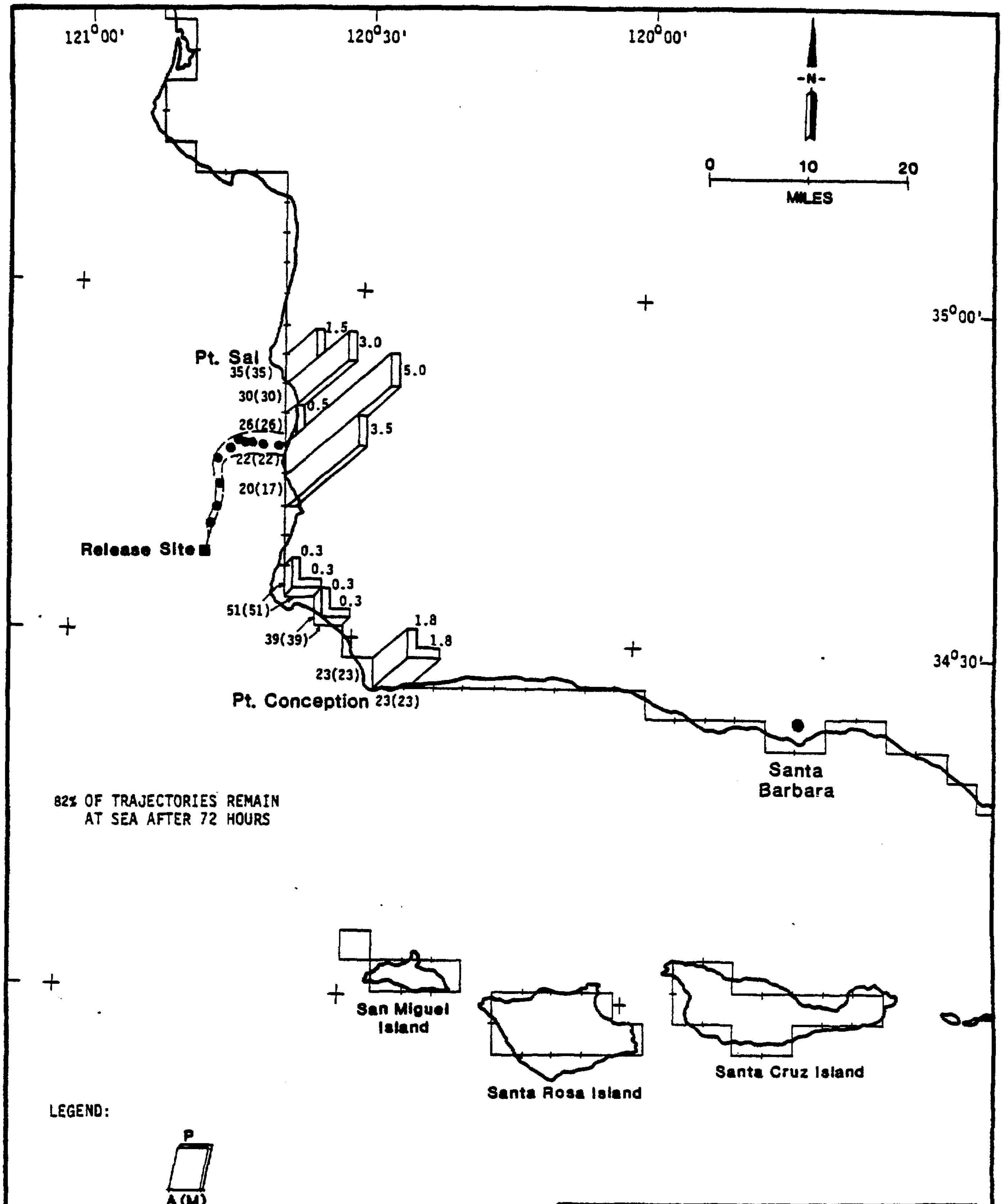


FIGURE 4.g-27

DISTRIBUTION OF SHORELINE CONTACTS LEASE P-0440 PLATFORM SITE (NOVEMBER)



WHERE:

P = PERCENT OF TOTAL TRAJECTORIES

A = AVERAGE TIME TO SHORELINE CONTACT (HRS.)

(M) = MINIMUM TIME TO SHORELINE CONTACT (HRS.)

72 HOUR TRAJECTORIES

FIGURE 4.g-28

DISTRIBUTION OF SHORELINE ~~CONTRACTS~~ CONTACTS LEASE P-0440 PLATFORM SITE (DECEMBER)

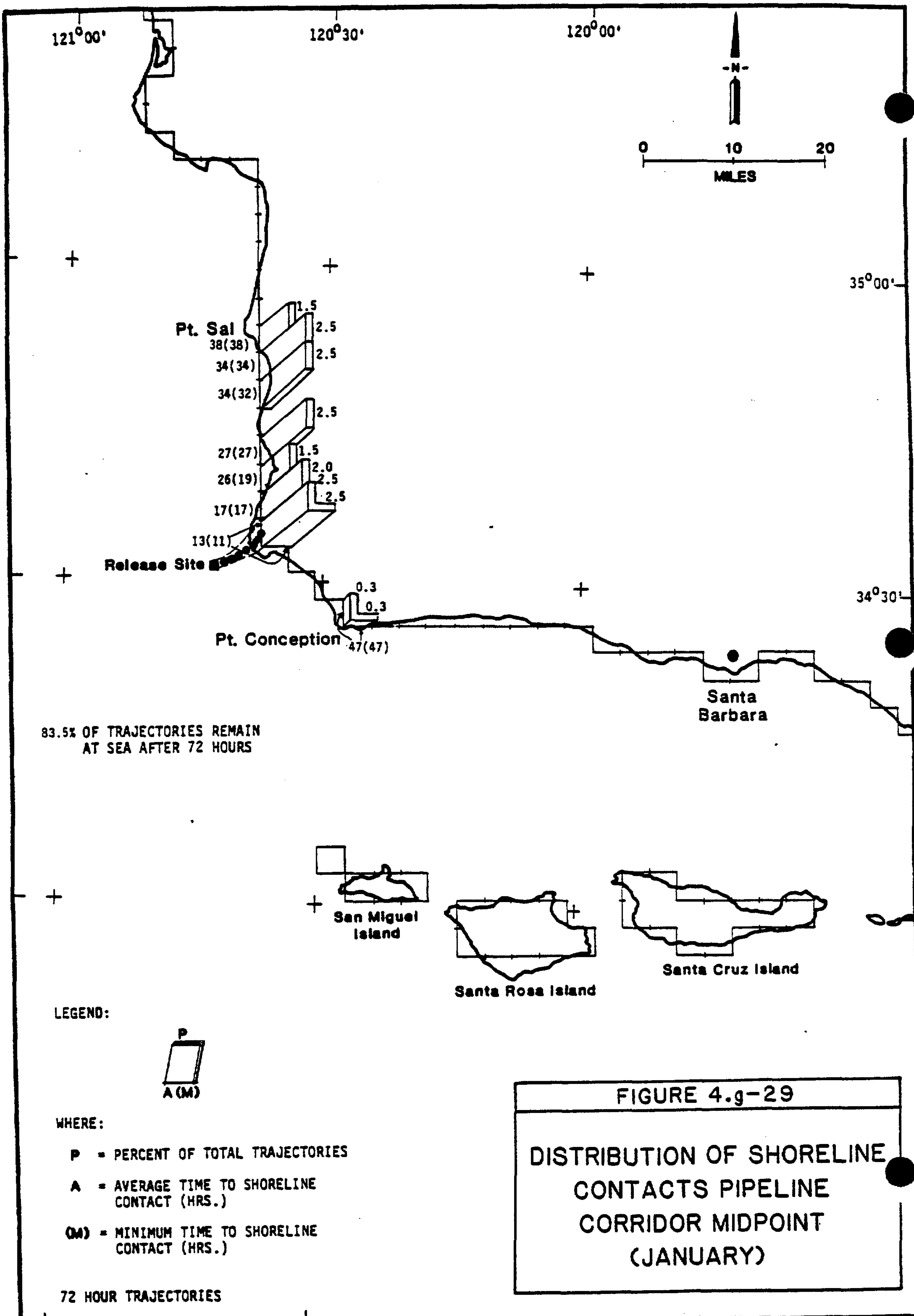
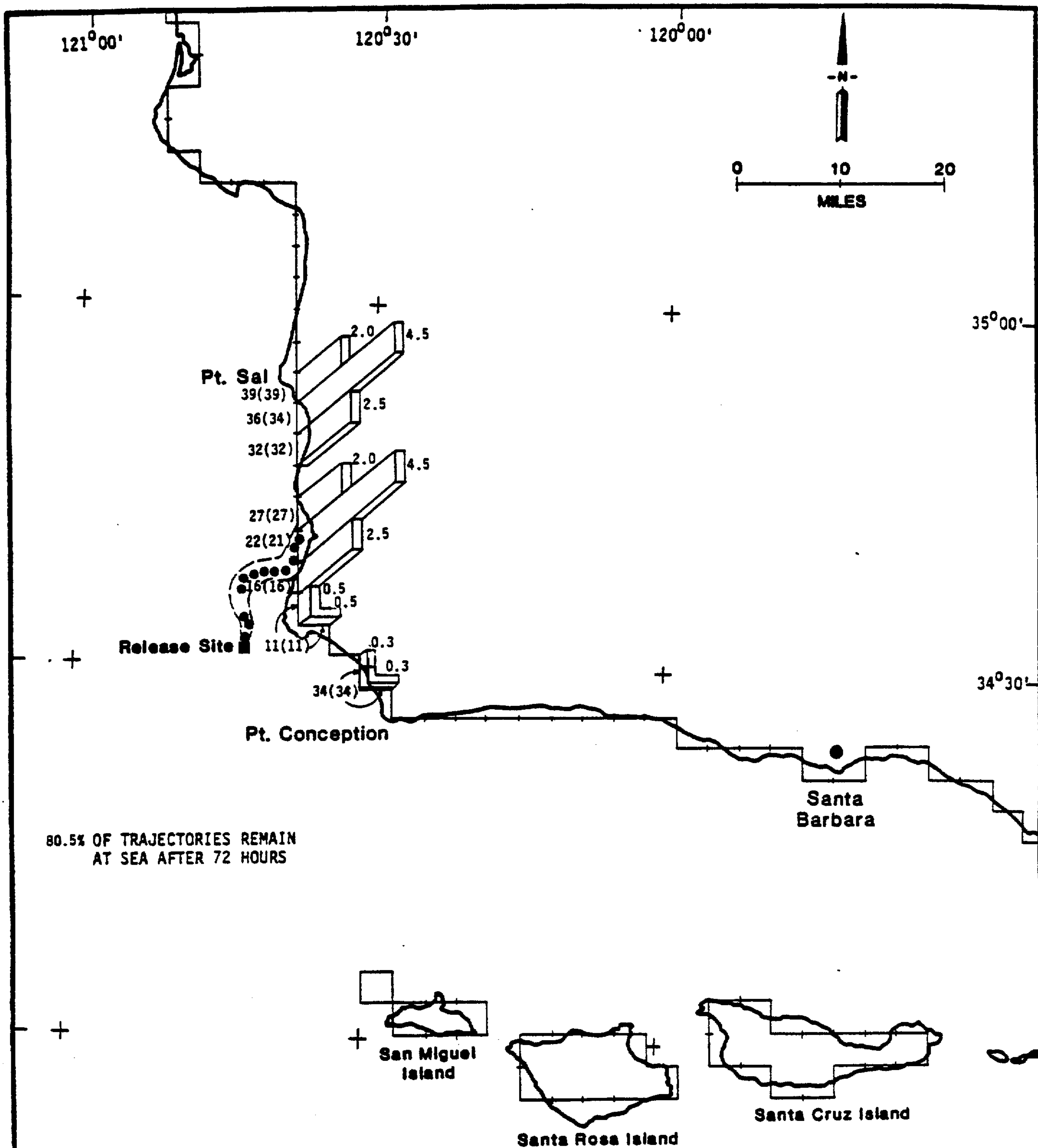


FIGURE 4.g-29

DISTRIBUTION OF SHORELINE CONTACTS PIPELINE CORRIDOR MIDPOINT (JANUARY)



LEGEND:

WHERE:

P = PERCENT OF TOTAL TRAJECTORIES

A = AVERAGE TIME TO SHORELINE CONTACT (HRS.)

(M) = MINIMUM TIME TO SHORELINE CONTACT (HRS.)

72 HOUR TRAJECTORIES

FIGURE 4.g-30

DISTRIBUTION OF SHORELINE CONTACTS PIPELINE CORRIDOR MIDPOINT (FEBRUARY)

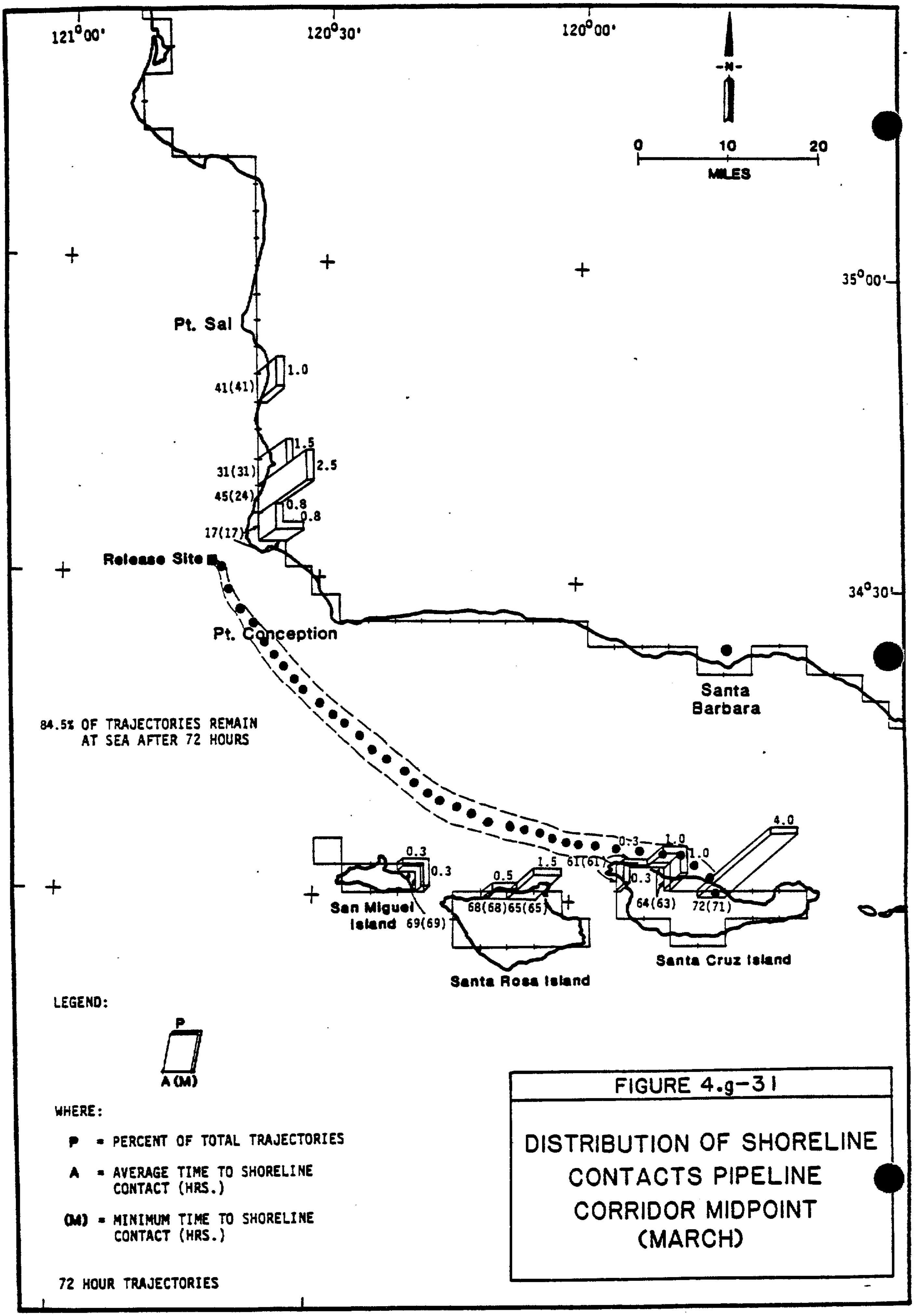
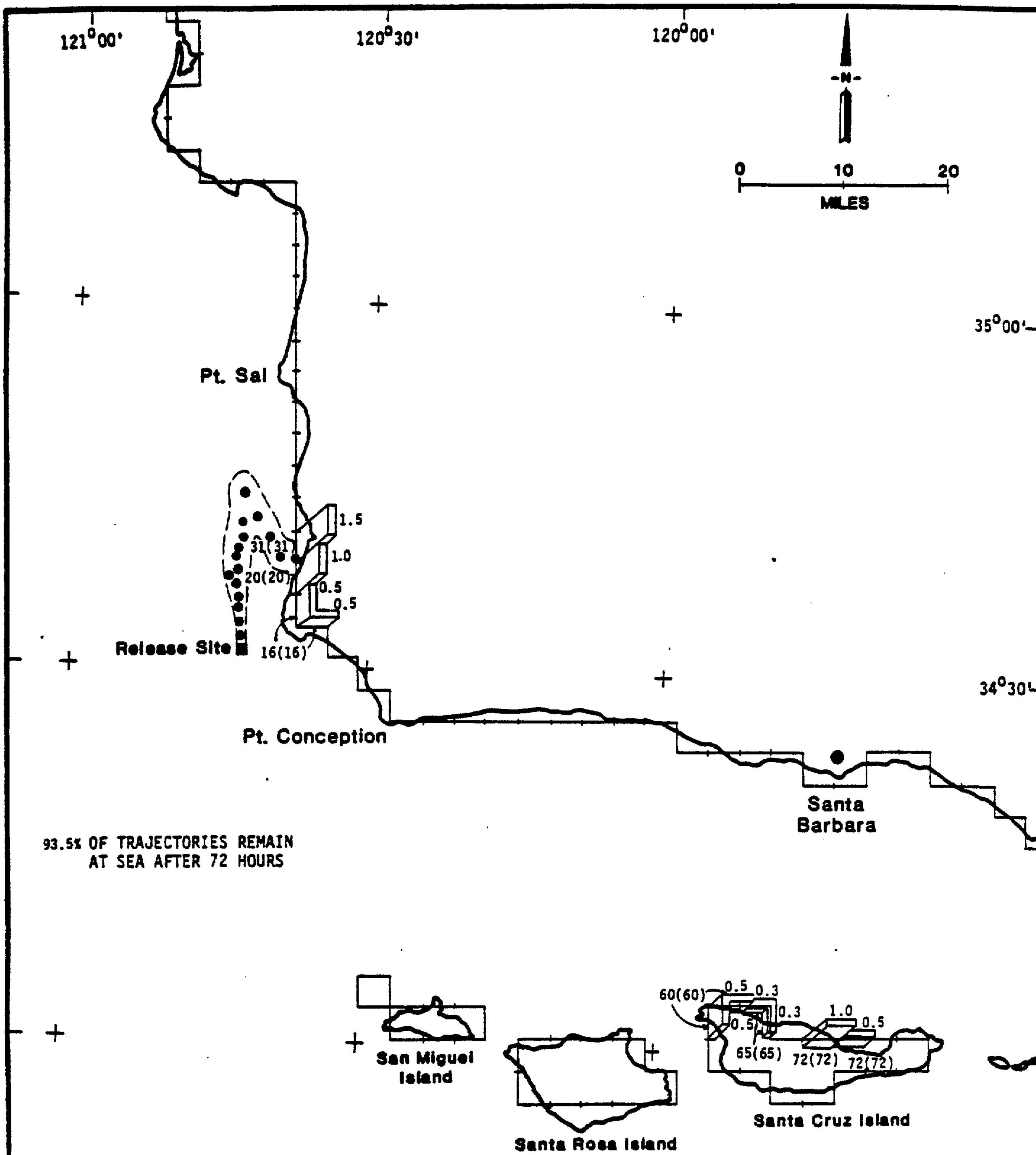


FIGURE 4.g-31

DISTRIBUTION OF SHORELINE CONTACTS PIPELINE CORRIDOR MIDPOINT (MARCH)



LEGEND:

P

A (M)

WHERE:

P = PERCENT OF TOTAL TRAJECTORIES

A = AVERAGE TIME TO SHORELINE CONTACT (HRS.)

(M) = MINIMUM TIME TO SHORELINE CONTACT (HRS.)

72 HOUR TRAJECTORIES

FIGURE 4.g-32

DISTRIBUTION OF SHORELINE CONTACTS PIPELINE CORRIDOR MIDPOINT (APRIL)

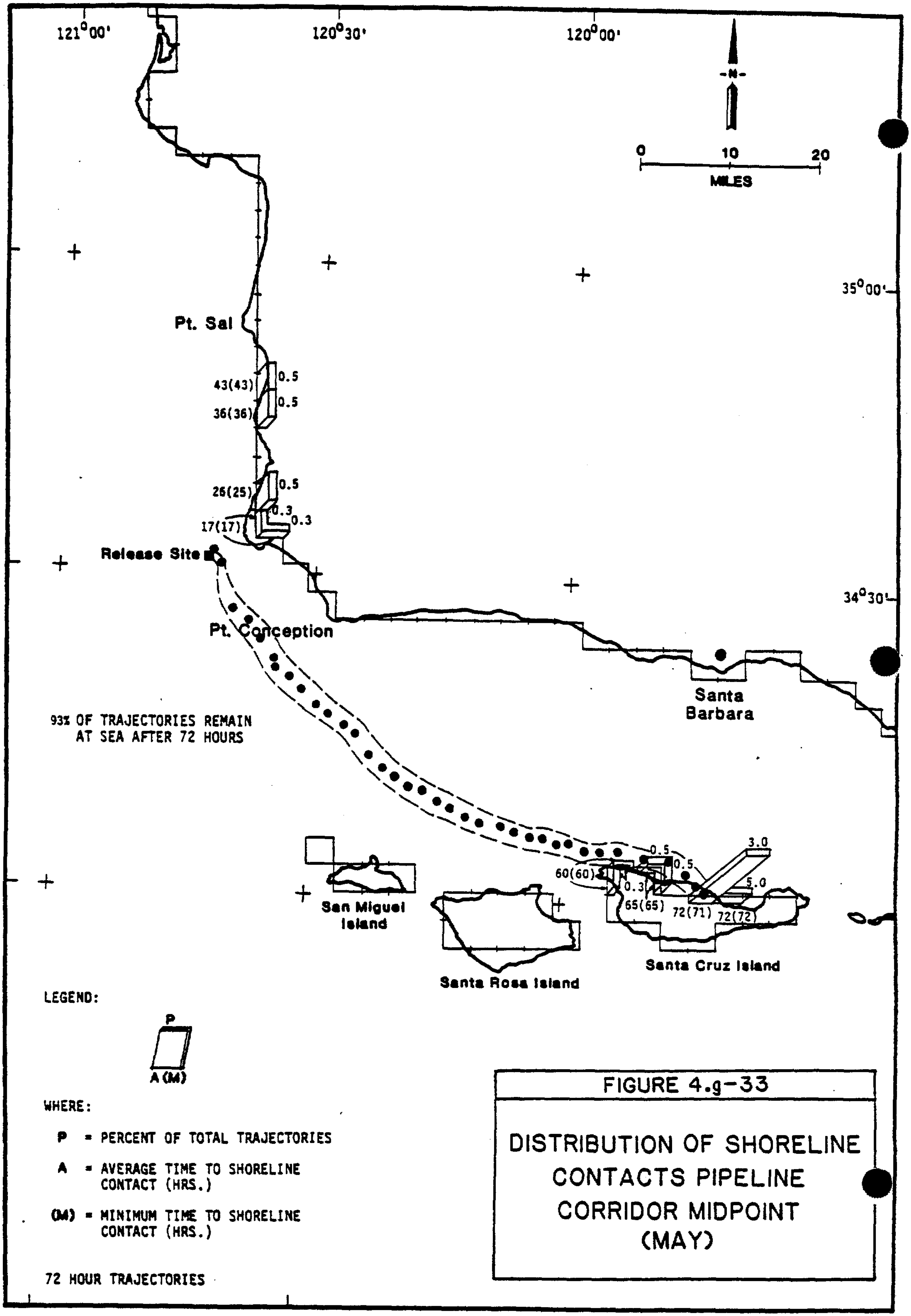


FIGURE 4.g-33

DISTRIBUTION OF SHORELINE CONTACTS PIPELINE CORRIDOR MIDPOINT (MAY)

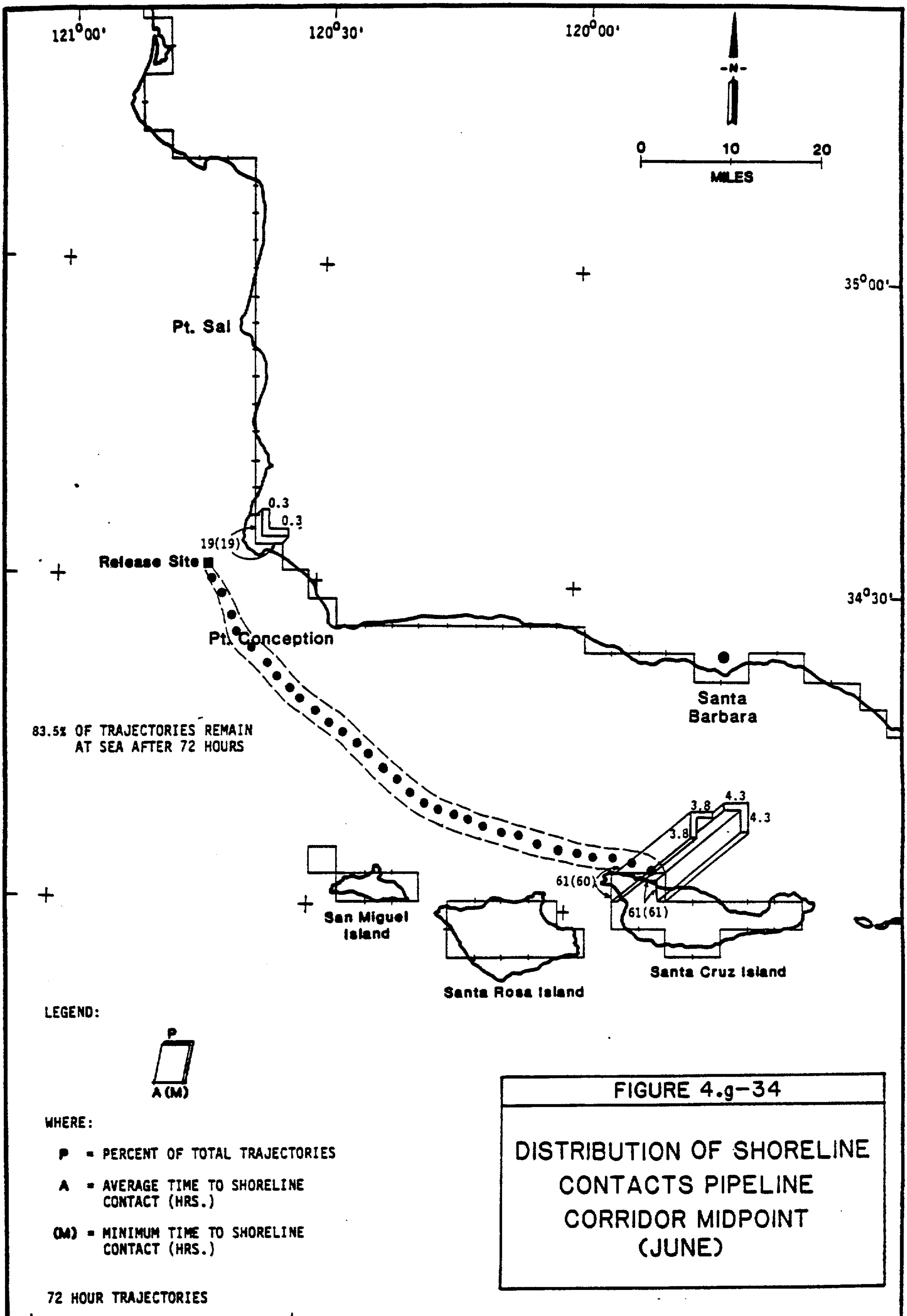


FIGURE 4.g-34

DISTRIBUTION OF SHORELINE CONTACTS PIPELINE CORRIDOR MIDPOINT (JUNE)

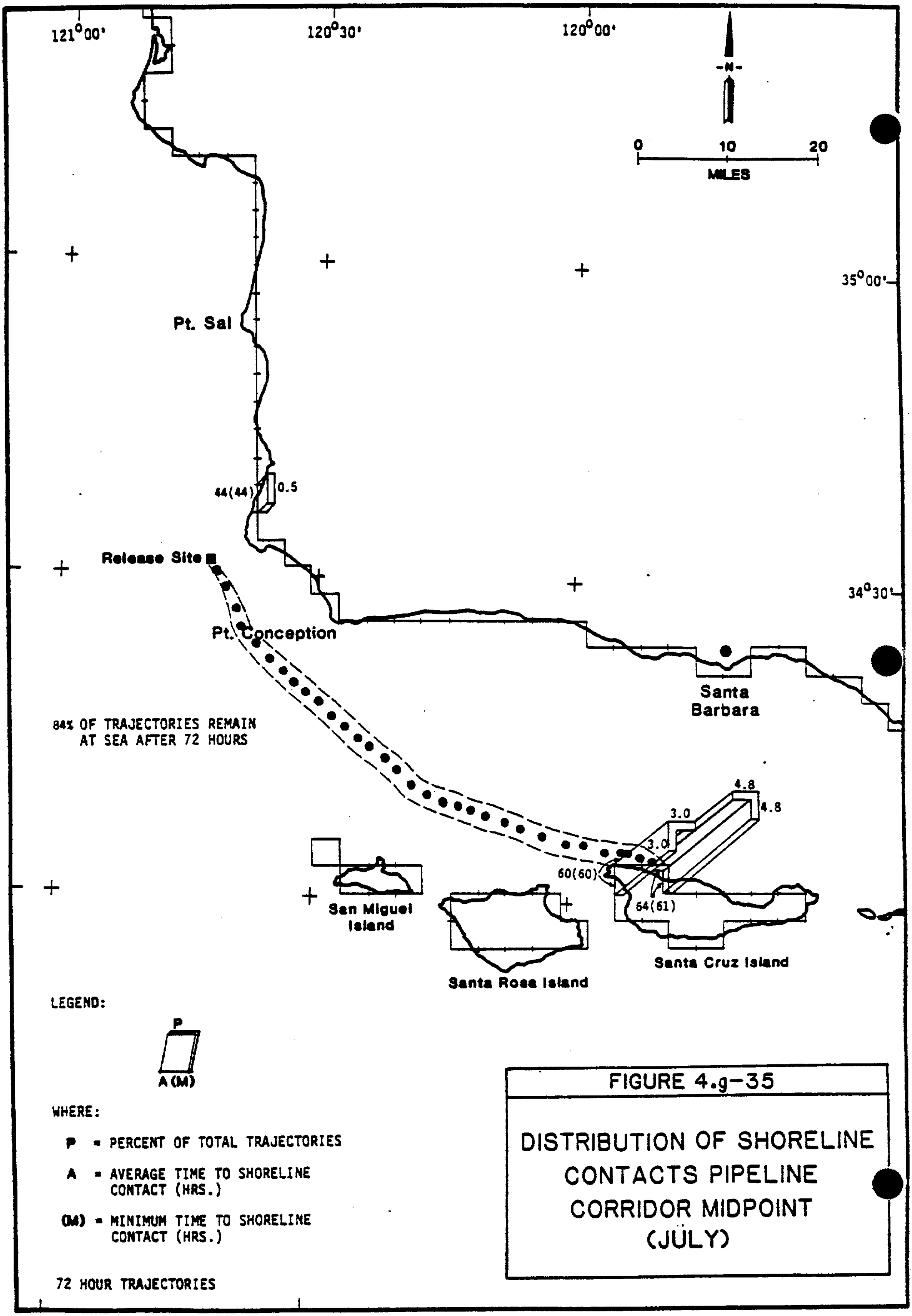


FIGURE 4.g-35

DISTRIBUTION OF SHORELINE CONTACTS PIPELINE CORRIDOR MIDPOINT (JULY)

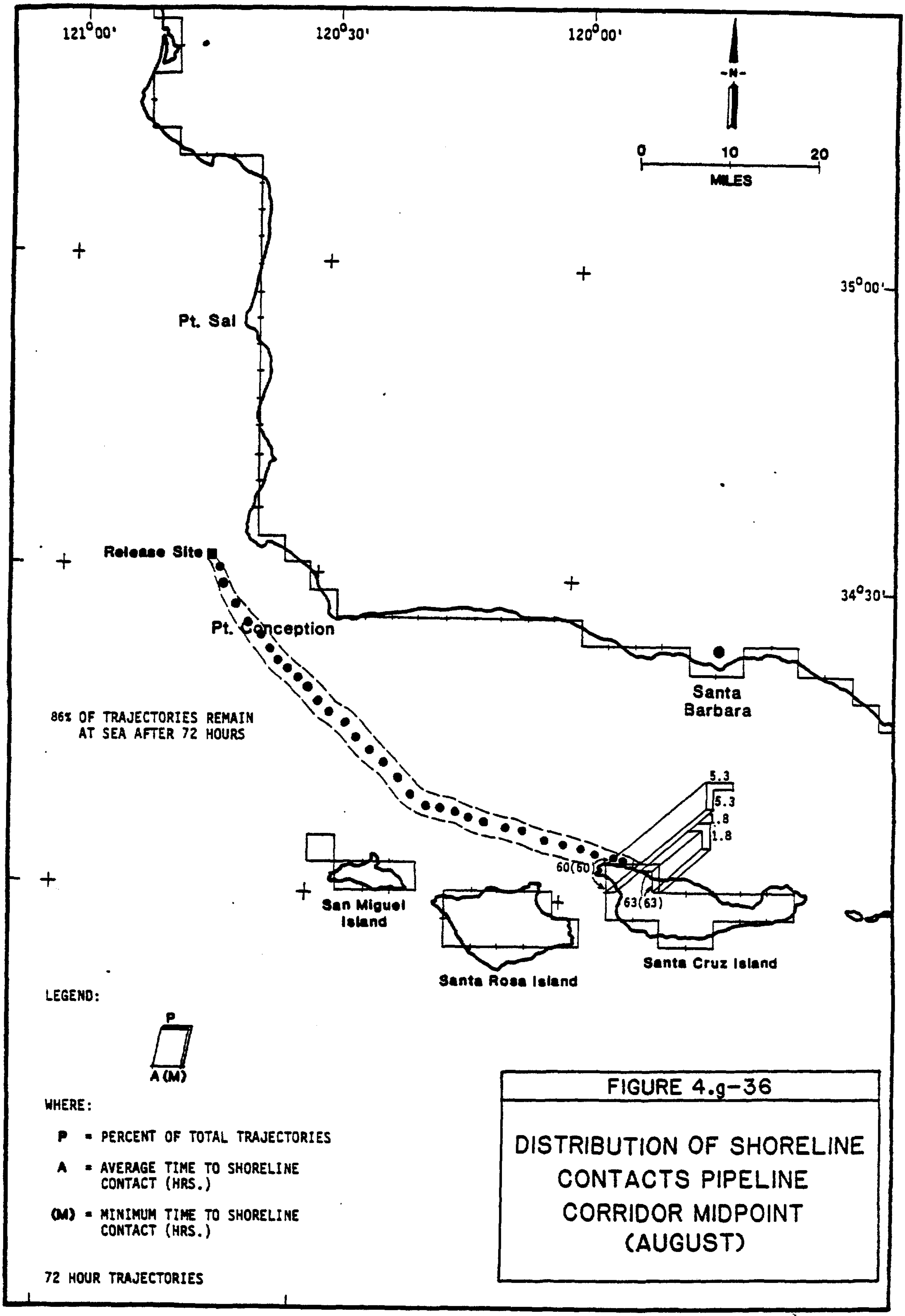


FIGURE 4.g-36

DISTRIBUTION OF SHORELINE CONTACTS PIPELINE CORRIDOR MIDPOINT (AUGUST)

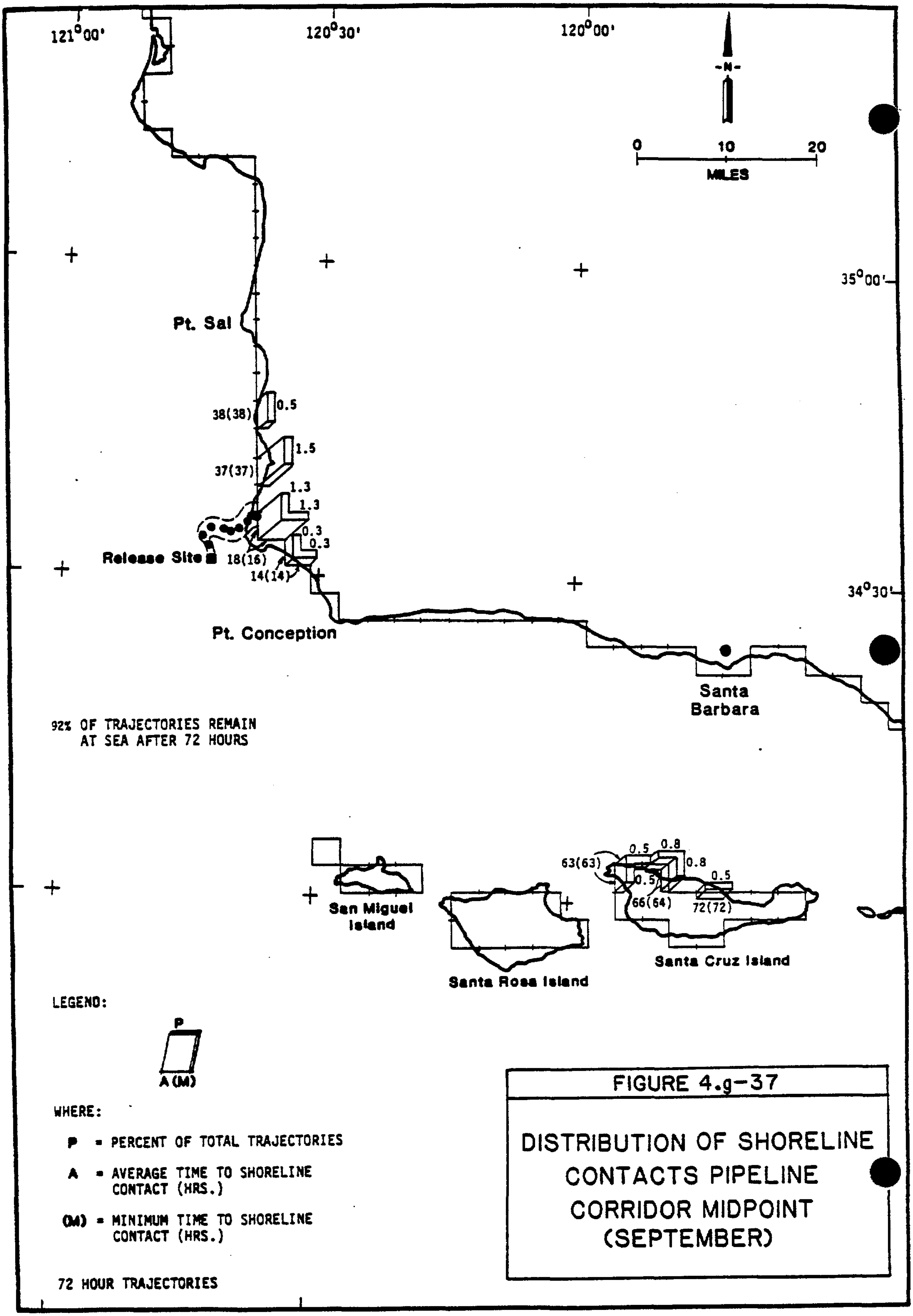
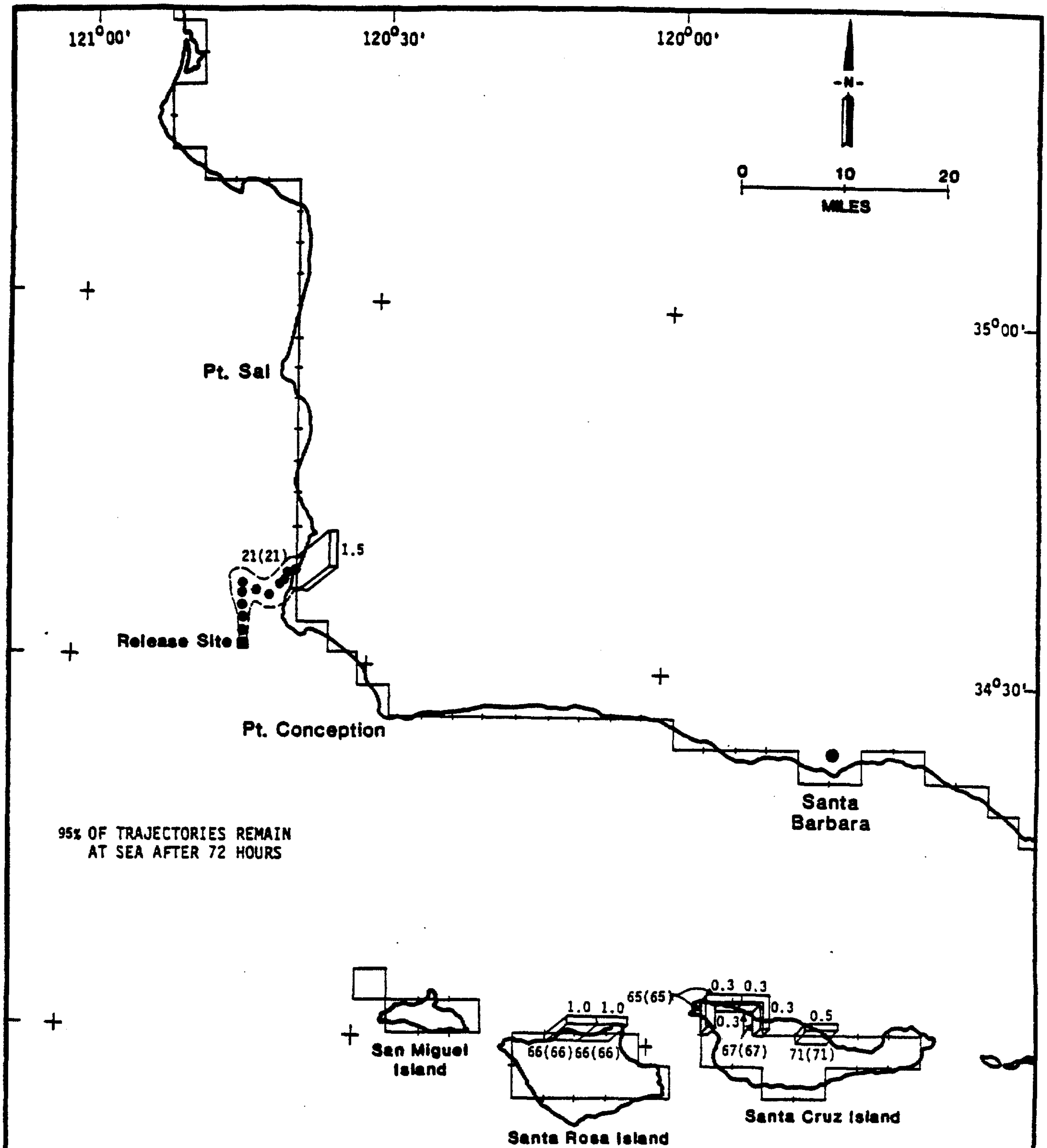


FIGURE 4.g-37

DISTRIBUTION OF SHORELINE CONTACTS PIPELINE CORRIDOR MIDPOINT (SEPTEMBER)



LEGEND:

WHERE:

P = PERCENT OF TOTAL TRAJECTORIES

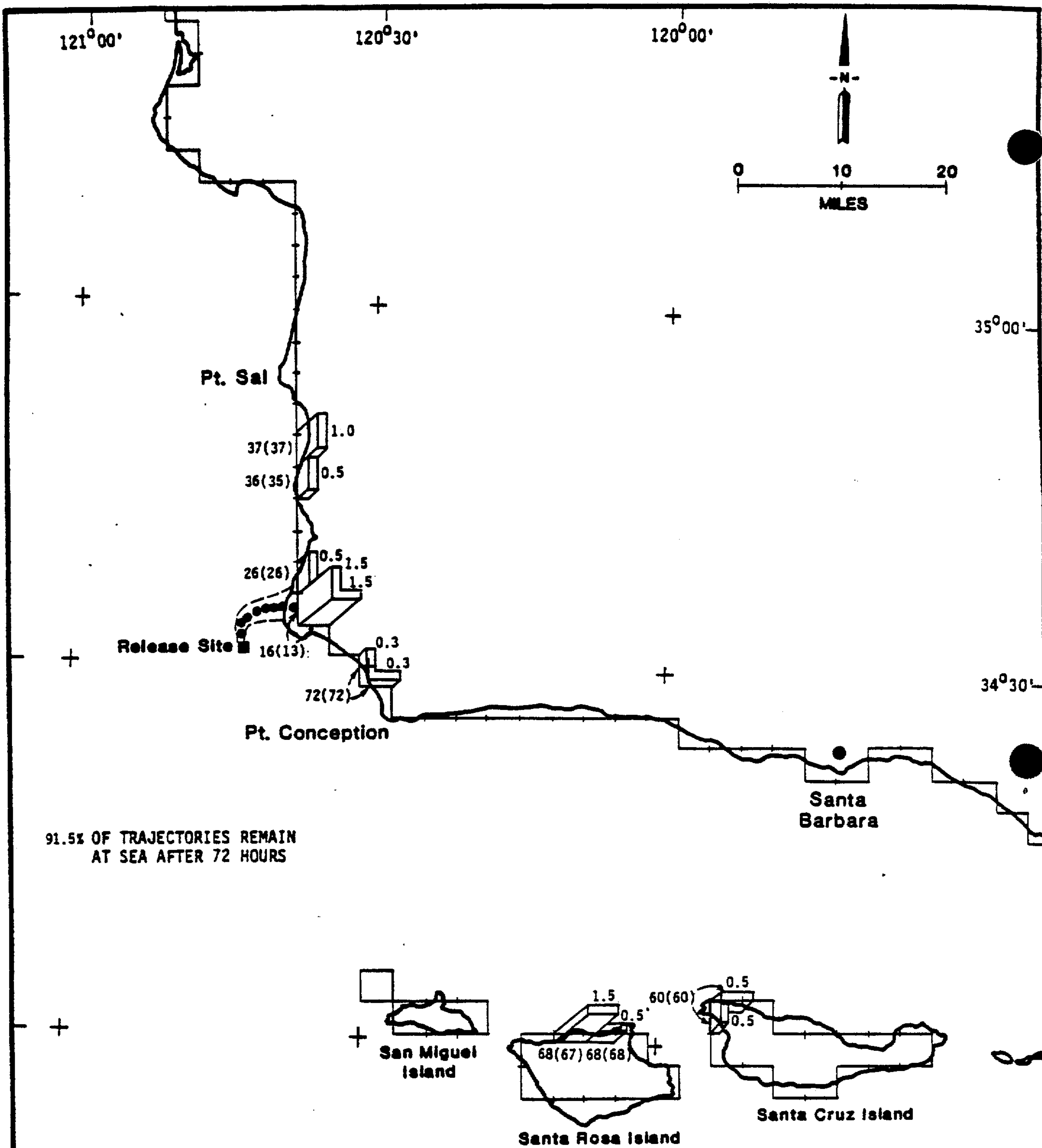
A = AVERAGE TIME TO SHORELINE CONTACT (HRS.)

(M) = MINIMUM TIME TO SHORELINE CONTACT (HRS.)

72 HOUR TRAJECTORIES

FIGURE 4.g-38

DISTRIBUTION OF SHORELINE CONTACTS PIPELINE CORRIDOR MIDPOINT (OCTOBER)



LEGEND:

P

A (M)

WHERE:

P = PERCENT OF TOTAL TRAJECTORIES

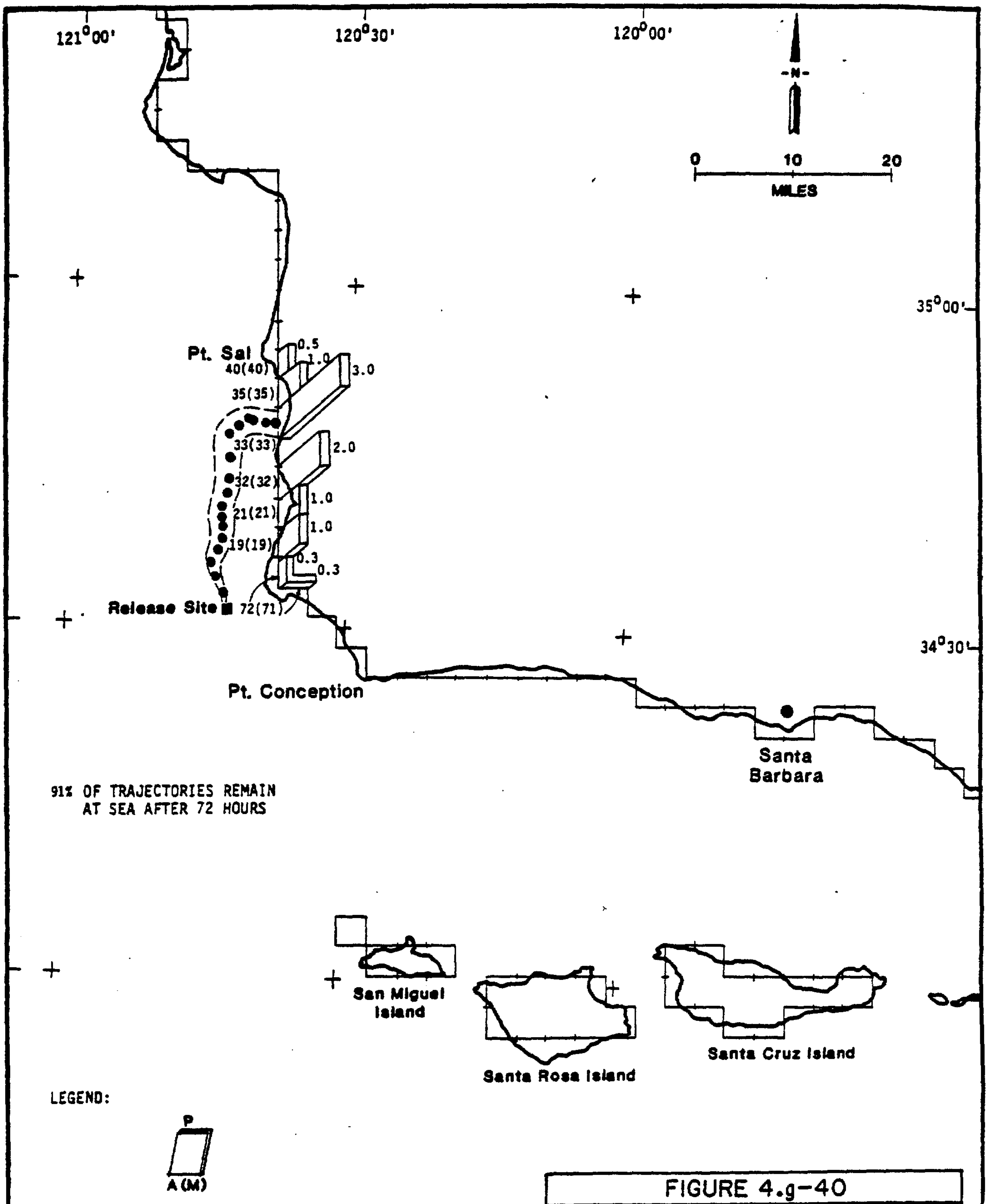
A = AVERAGE TIME TO SHORELINE CONTACT (HRS.)

(M) = MINIMUM TIME TO SHORELINE CONTACT (HRS.)

72 HOUR TRAJECTORIES

FIGURE 4.g-39

DISTRIBUTION OF SHORELINE CONTACTS PIPELINE CORRIDOR MIDPOINT (NOVEMBER)



91% OF TRAJECTORIES REMAIN AT SEA AFTER 72 HOURS

LEGEND:

WHERE:

P = PERCENT OF TOTAL TRAJECTORIES

A = AVERAGE TIME TO SHORELINE CONTACT (HRS.)

(M) = MINIMUM TIME TO SHORELINE CONTACT (HRS.)

72 HOUR TRAJECTORIES

FIGURE 4.g-40

DISTRIBUTION OF SHORELINE CONTACTS PIPELINE CORRIDOR MIDPOINT (DECEMBER)

12. STORAGE AND DISPOSAL

STORAGE AND DISPOSAL

Storage

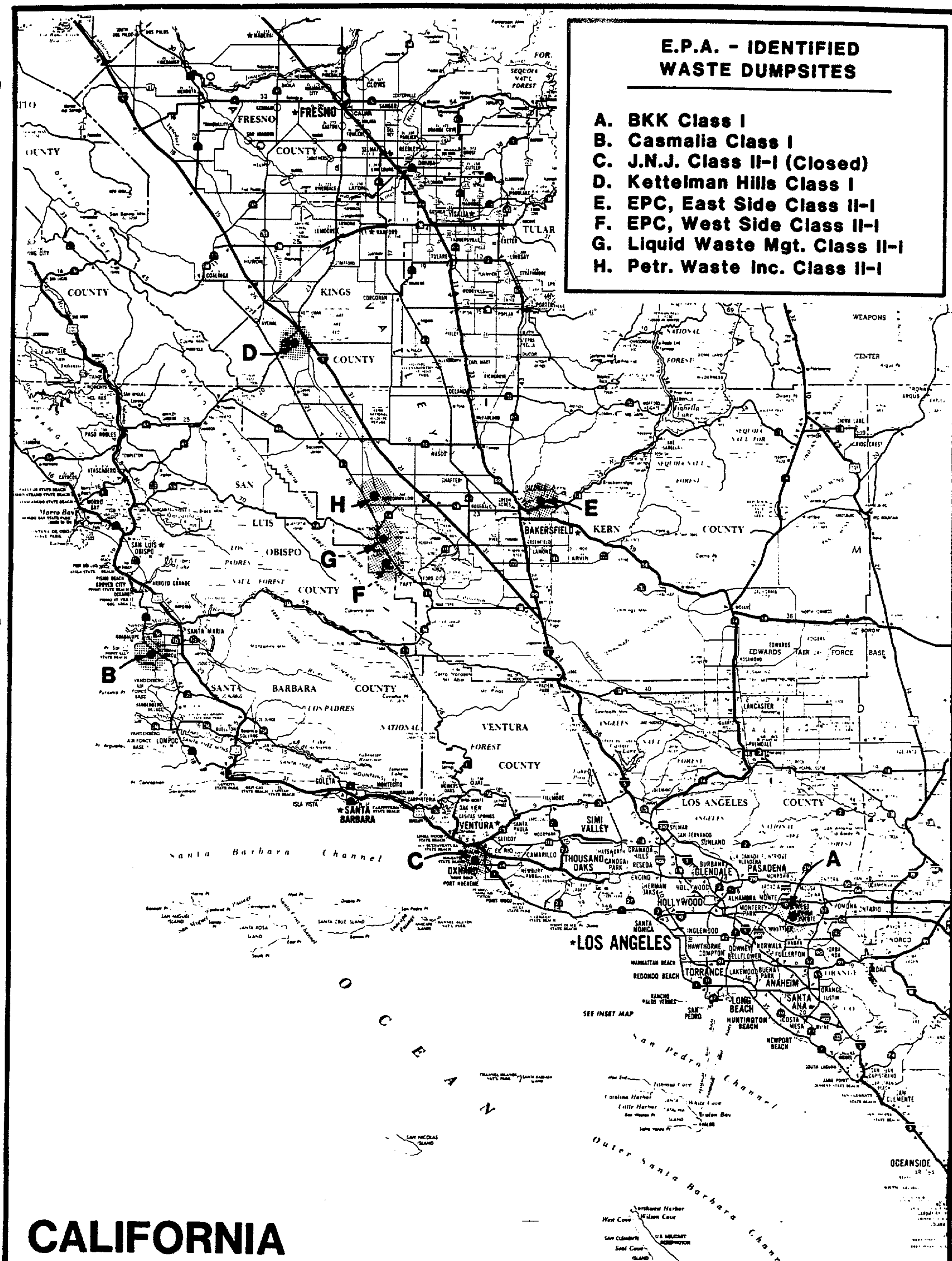
Temporary storage is an essential part of oil spill recovery operations. The present state-of-the-art storage for minor spills is a container that functions as an oil/water separator and stores a high percentage of oil only. The storage/container of the Walosop skimmer meets this criteria. The most common type of temporary storage container maintained at offshore facilities is the floating storage bag. Exxon maintains these bags at each site as back-up storage containers in the event they are required. The preferred method of storing recovered oily debris such as oiled sorbent material and vegetation, is in heavy duty plastic bags that can be readily transported and disposed of at approved onshore disposal sites. However, any nonleakable container such as drums or solid sided dumpsters can be used to store oily debris. In the event of a large spill of several thousand barrels, Clean Seas storage barge Tide-Mar VII would be activated for storage. The Tide-Mar VII which stores 7840 barrels is described in detail in the equipment section of this plan.

Disposal

Disposal of a large volume of recovered oil from an offshore facility may be returned to an offshore production facility and separated through the deck drainage/rerun system if it is free of debris. This would be oil that is recovered by a skimmer containing only oil/water. Oily debris containing vegetation, trash, or sorbent material must be hauled to shore for disposal at an approved California Department of Health Services (DOHS) hazardous waste site. Disposal of oily debris must comply with the regulations of the EPA, DOHS and the Regional Water Quality Control Board. To ensure Exxon compliance with these agencies, hazardous waste manifest must be properly filled out be the generator (Exxon), transported by approved haulers and taken to approved waste disposal sites. the following table and plat list and locate the present southern California DOHS approved hazardous waste disposal facilities.

SOUTHERN CALIFORNIA
HAZARDOUS WASTE DISPOSAL SITES

DISPOSAL FACILITY	CALIFORNIA SWRCB CLASS	EPA I.D. #	OPERATOR	CONTACT	DISPOSAL SITE LOCATION
BKK (West Covina) * Closed for liquid waste*	1	CAD 067 786 749	BKK Corporation 2250 237th Street	Joe Fulton (213) 810-1085	2210 So. Azusa Ave. West Covina, 91792 2 mi South of San Bernardino Freeway on left side, (left turn lane), entrance well marked
Casmalia	1	CAD 020 748 125	Casmalia Resource Co. P.O. Box 5275 Santa Barbara, 93108	Ms. Jan Lachenmaier (805) 969-5897	S.W. of Santa Maria about 10 miles. Exit Betteravia Rd. off Hwy 101, W. on Betteravia to Mahoney Rd. which bears left at Y, S.W. on Mahoney which merges into Black Rd., continue on Black Rd. crossing Hwy 1. Site is on the right about 3 mi. past Hwy 1, marked with a small sign (Casmalia Resources)
Kettleman Hills	1	CAT 000 646 117	Chemical Waste Mgt. P.O. Box 471 Kettleman City, 93239	Mark Langowski (209) 386-9711	West of Kettleman City, 3 miles West of I-5 on Hwy 41. Entrance on right has a small hard to see sign.
Petroleum Waste (Buttonwillow)	11-1	CAD 980 675 276	Petroleum Waste Inc. P.O. Box 3366 Bakersfield, 93385	Gary J. Leary (805) 325-5355	Exit I-5 W on Hwy 58 W. through Buttonwillow, cont. 3 1/2 mi. to Lokern Rd., W. on Lokern 4 mi. site on north side of road. Roads are well marked, site is visible.
EPC East Side (Round Mountain)	11-1	CAD 030 384 267	Environ. Protect. Corp. 3040 19th St. Bakersfield, 93301	Chris O'harra (805) 327-9681	Exit Airport Rd. from Hwy 99 in Bakersfield, bear right on Roberts, E. on Roberts to Chester, N. on Chester 3 blks to China Grade Rd, E. on China Grade which turns into Round Mtn. Rd., cont. on Round Mtn. Rd. several miles, site is on left and well marked with EPC sign and flagpoles.
EPC West Side (Fellows)	11-1	CAT 080 010 283	" "	" "	Site on Hwy 33, 3 miles N. of Fellows or 10 miles S. of McKittrick. Site on W. side of road. Hard to see sign. Getty field office large metal barn next to turn off.
Liquid Waste Mgt. (McKittrick) *Do not use for Exxon waste*	11-1	CAD 980 638 498	Liquid Waste Mgt. P.O. Box B Stanton, CA 90680	Gene Kozlowski (714) 828-8330	South on Hwy 33/58 through McKittrick, S. 1 mi. turn right on Hwy 58, site on left, entrance about 1/4 mi. from Hwy 33, sign visible.
JNJ Dump Site (Oxnard) ** CLOSED	11-1	CAD 980 636 773	J.N.J. Sales & Service 1579 Los Angeles Ave. Saticoy	Jack Jammar (805) 656-3836	Site is located at the N.E. corner of Harbor Blvd. and 5th Street in Oxnard. Entr[illegible] off 5th Street.


E.P.A. - IDENTIFIED WASTE DUMPSITES
A. BKK Class I
B. Casmalia Class I
C. J.N.J. Class II-I (Closed)
D. Kettelman Hills Class I
E. EPC, East Side Class II-I
F. EPC, West Side Class II-I
G. Liquid Waste Mgt. Class II-I
H. Petr. Waste Inc. Class II-I
A
B
C
D
E
F
G
H
FRESNO
FRESNO COUNTY
KINGS COUNTY
TULARE
SAN LUIS OBISPO COUNTY
KERN COUNTY
BAKERSFIELD
SANTA BARBARA COUNTY
VENTURA COUNTY
LOS ANGELES COUNTY
LOS ANGELES
SANTA MARIA
SANTA BARBARA
VENTURA
OXNARD
PASADENA
GLENDALE
HOLLYWOOD
LONG BEACH
ANAHEIM
SANTA ANA
OCEANSIDE
Santa Barbara Channel
San Pedro Channel
Outer Santa Barbara Channel
OCEAN
CALIFORNIA

United States Department of the Interior

MINERALS MANAGEMENT SERVICE
PACIFIC OCS REGION
1340 WEST SIXTH STREET
LOS ANGELES, CALIFORNIA 90017

July 28, 1982

In Reply Refer To: 150
MMS-Mail Stop

Re: Oil Spill Contingency Plan Guidelines, Pacific OCS Region

The Minerals Management Service, Pacific OCS Region, has developed guidelines to aid lessees in the preparation of oil spill contingency plans. Listed below are these guidelines and amplifying information. Effective August 1, 1982, all oil spill contingency plans submitted for approval to the Deputy Minerals Manager (DMM), Field Operations must conform to the guidelines. Plans submitted and approved prior to August 1, 1982 for ongoing drilling/production operations which do not meet these guidelines are to be modified and resubmitted to the DMM, Field Operations for approval no later than February 28, 1983. In addition to these guidelines, existing oil spill response capabilities are to be upgraded to "state-of-the-art" as defined in Commandant Notice No. 5740 (enclosed) by February 28, 1983. Also enclosed for your information is Section 408 of the Region IX Oil and Hazardous Substance Contingency Plan, entitled "Schedule of Chemicals to Remove Oil and Hazardous Substances." This section details the approval procedure and the information that must be provided prior to the Regional Response Team (RRT) rendering a decision on the use of dispersants. Lessees are reminded that oil spill contingency plans are required to be reviewed and updated annually with all modifications promptly submitted to the DMM, Field Operations for approval.

Oil spill contingency plans are to contain the following:

1. Provisions to assure that full resource capability is known and can be committed during an oil spill, including the identification and inventory of applicable equipment, materials, and supplies which are available locally and regionally, both committed and uncommitted, and the time required for deployment of the equipment. Vessels or vessel types to be used in deploying and operating the response equipment and dispersant equipment, types, and toxicities proposed for use shall also be identified.

2. A discussion of the lessee's relationship with respect to any oil spill cooperatives. If a member, then describe how, when, and to what degree

the lessee will use the cooperative and what the respective roles will be during a spill. In this regard, describe to what degree the lessee will rely upon the cooperative to manage and perform the cleanup and provide equipment and technical advice.

3. Provisions for varying degrees of response effort depending upon the severity of the oil spill, including how additional equipment will be made available for extraordinary spills that exceed the recovery capacity of the readily available equipment.

4. Provisions that drills and training for familiarization with pollution-control equipment and operational procedures will be conducted in accordance with OCS Order No. 7.

5. Provisions for identifying and protecting areas of special biological sensitivity, including:

(a) Maps of sufficient scale to identify areas of special biological sensitivity. Sensitive areas to be identified include: critical habitats for endangered/threatened species, rocky intertidal shorelines, kelp beds, estuaries, marsh/wetlands, nesting areas for marine birds and marine mammal haulout and breeding areas.

(b) A discussion concerning the protection and handling of oiled marine birds and mammals. The names and telephone numbers of those agencies to be contacted which have responsibility for the protection of oiled marine birds and mammals should be given.

(c) General strategies and procedures for protecting the various types of vulnerable resources which could be impacted.

(d) Initial site-specific response strategies for protecting those especially biologically sensitive areas which oil spill trajectory analysis indicates could potentially be impacted. The strategies should be based upon the characteristics of the oils being handled as well as environmental conditions and equipment characteristics and anticipated use of dispersants/chemical agents.

6. A risk analysis which indicates the number and size of spills that could occur during OCS exploration, development, and production operations. Also, a detailed oil spill trajectory analysis shall be included which indicates where spilled oil is likely to travel with time. These trajectories shall be on a monthly or at least a seasonal basis and shall be based on known surface currents and average wind/weather conditions. The risk analysis for the number and size of anticipated spills contained in the Environmental Impact Statement for the sale area is appropriate upon which to base the trajectory analysis.

7. Provisions for the establishment of procedures for the purpose of early detection and timely notification for well-defined and specific actions to be taken after discovery of an oil spill. This would include a current list of names, telephone numbers, and addresses of the responsible persons and alternates on call to receive notification of an oil spill, and the names,

telephone numbers, and addresses of regulatory organizations and agencies to be notified when an oil spill is discovered, including:

(a) Specification of an oil spill response operating team consisting of trained, prepared, and available operating personnel;

(b) Predesignation of an oil spill response coordinator who is charged with the responsibility and is delegated commensurate authority for directing and coordinating response operations; and

(c) A preplanned location for an oil spill response operations center and a reliable communications system for directing the coordinated overall response operations.

8. Provisions for storage and disposal of recovered materials.

If you have any questions, please contact Messrs. Andy Clifton or Glenn Shackell of my staff at (213) 688-2846.

Sincerely yours,

Thomas W. Dunaway

for H. T. Cypher
Deputy Minerals Manager
Field Operations, Pacific OCS Region

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS:
U. S. Coast Guard (G-WER
Washington, DC 20593
Phone: (202) 426-9568

COMDTNOTE 5740
15 APR 1982

COMMANDANT NOTICE 5740 CANCELLED: 15 OCT 1982

Subj: Memorandum of Understanding between the U. S. Geological Survey and the U. S. Coast Guard Concerning Regulation of Activities and Facilities on the U. S. Outer Continental Shelf

Ref: (a) Federal Register, Vol. 46, No. 5, Thursday, Jan 8, 1981, page 2199

1. PURPOSE. This notice provides amplifying information and revised guidelines to be used by On-Scene Coordinators in the review of oil spill contingency plans submitted to the Minerals Management Service (MMS) as part of OCS Exploration Plans, or Development and Production Plans. The guidelines established in COMDTNOTE 5740 of 14 May 1981 are superceded effective 1 June 1982.

2. DISCUSSION.

a. The U. S. Geological Survey (USGS) and the USCG signed subject MOU to promote the safety of activities and facilities on the OCS. The text of the MOU was published in reference (a). The MOU affects activities associated with the exploration, development, and production of mineral resources on the OCS, and is intended to avoid duplication of effort, and to promote consistent, coordinated, and less burdensome regulation of these facilities. In a recent Department of Interior internal reorganization, responsibility for OCS activities was transferred from USGS to the newly created Minerals Management Service. This organizational name change does not otherwise effect the MOU.

DISTRIBUTION - SDL No. 115

	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z
A																										
B		4	10		12									5												
C					5		2		1																	
D		5			1																					
E		1												1	5											
F																										
G																										
H																										

* NON-STANDARD DISTRIBUTION:

2.b. Paragraph VII of the MOU gives the CG the responsibility to review the adequacy of the oil spill contingency plans submitted to the MMS as a part of the Exploration Plans or Development and Production Plans. The MOU further states that the criteria by which to judge the adequacy of the oil spill response organization, clean up equipment, and procedures will be jointly agreed upon by the MMS and the USCG. The On-Scene Coordinator for the zone in which the drilling activity will occur will conduct this review. Planning guidelines for conducting this review were initially developed for Lease Sale 42 on Georges Bank and later were promulgated for nationwide application in COMDTNOTE 5740 of 14 May 1981. While the guidelines have been implemented quite effectively for Lease Sale 42, it has become apparent that they do not allow sufficient flexibility to meet the diverse geographic differences and local conditions in other areas where drilling or production activity occur.

c. Revised guidelines for evaluating OCS oil spill contingency plans have been jointly agreed upon by MMS and USCG and are contained in enclosure (1). They are intended to provide general consistency in setting standards nationwide while allowing some flexibility to account for local conditions. The planning guidelines apply to OCS Exploration Plans or Development and Production Plans submitted for approval after 1 June 1982. Plans submitted and approved prior to that date are not affected by these guidelines except that operators at ongoing drilling/production operations shall ensure existing response equipment is upgraded to "state-of-the-art" as it is replaced.

d. A regional Technical Review Board (TRB) will assist OSCs in assessing the capabilities of open water equipment and in applying the general guidelines of enclosure (1) to his particular area. Specifically the TRB will:

(1) advise the OSC on whether response equipment proposed in the contingency plan meets currently accepted "state-of-the-art" criteria.

(2) advise the OSC on the adequacy of the amounts and types of equipment proposed.

(3) advise the OSC on acceptable response times for local conditions.

(4) keep abreast of developments in response equipment technology and revise "state-of-the-art" criteria accordingly.

(5) provide OSCs with technical information on equipment proposed by operators.

2.e. Membership of the regional Technical Review Board is:

USCG District Commander representative - Co-chairman
MMS Deputy Minerals Manager Representative - Co-chairman
Appropriate USCG National Strike Force Commanding Officer
USEPA OHMSETT representative
USCG HQ DMT representative
USCG HQ WER representative
MMS HQ representative

3. ACTION.

a. District Commanders shall:

(1) Establish and maintain liaison with the appropriate Minerals Management official [see enclosure (2)] to ensure that oil spill contingency plans for the OCS are submitted for timely review.

(2) Establish a regional Technical Review Board as described above to assist OSCs in reviewing contingency plans.

b. On-Scene Coordinators shall consider the Planning Guidelines of enclosure (1) in evaluating Oil Spill Contingency Plans submitted in accordance with the MOU and advise MMS as to adequacy of the Plans.

c. Commandant will incorporate the provisions of this Notice in the Marine Safety Manual, CG-495.

W.E. Caldwell

W. E. CALDWELL
Chief, Office of Marine
Environment and Systems

Encl: (1) Planning Guidelines
(2) Addresses and phone numbers of MMS points of contact

Planning Guidelines

a. Risk Analysis: The contingency plan should contain an analysis which indicates the number and size of spills that could occur during OCS mineral exploration, development, and production operations. The spill trajectory analysis should indicate where an oil spill is likely to flow under the various expected sets of local, seasonal meteorological and oceanographic conditions. Impact areas should be identified and strategies should be fully developed for the protection of potentially vulnerable areas and resources. The depth of detail is flexible but should be sufficient to assure the OSC that adequate contingency planning has been done.

b. Recovery Equipment: The type of recovery equipment and its method of deployment rests entirely with the operator. However, subject to the prevalent conditions identified in the risk analysis, the equipment should be "state-of-the-art". Based on previous R&D studies, observations, and experiences, currently available "state-of-the-art" equipment is capable of operating in 8-10 foot seas and 20 knot winds with deployment accomplished in the 5-6 foot range. However, the OSC should be aware that mechanical equipment cannot be expected to perform at optimum efficiencies in all environmental situations. Local conditions such as high energy sea states with short wave lengths, or severe icing, may not allow all of the above operational criteria to be met.

c. Equipment Availability: The quantity and capability of the equipment to be made available should be related to the risk analysis. For planning purposes, open water recovery devices typically have a recovery capacity of at least 1000 barrels/day. A recovery rate of 1000 barrels/day should therefore be considered appropriate unless the risk analysis suggests a higher spill rate is likely. This recovery rate may be attained from one device or an array of devices which would be utilized in concert with each other. The contingency plan should also indicate how additional equipment will be made available for extraordinary spills, that is, spills that exceed the recovery capacity of the readily available equipment.

d. Response Time: If local conditions or geography permit, the target for initiating recovery operations with pre-staged equipment (i.e., the response time) should be six to twelve hours from the time of the spill dependent upon the location and general operating characteristics of the drilling or production activity. Whatever amount of equipment is required to be available for responding to spills should be fully deployed and in operation within the specified response time, weather permitting. The location of staged equipment will be left to the operator. For extraordinary spills, the operator should be expected to obtain additional equipment within 48 hours.

e. Drills: Response exercises for deploying equipment in open water shall occur at least annually to test the equipment and the contingency plan. This exercise should be held under realistic environmental conditions in which deployment and operation can be accomplished without endangering the safety of personnel. In addition, at least one hands-on drill should be conducted annually as part of a training program and may include full deployment conducted in protected waters. Exercises that test the alerting/initial response mechanism and command, control, and communications should be held as frequently as necessary to demonstrate effectiveness to the OSC.

f. Support Vessels: Vessels or vessel types to be used in deploying and operating the response equipment should be identified in the contingency plan. The vessels should be available within the same response time parameters as used for response equipment. The crews of all candidate support vessels should be familiar with equipment deployment and operating techniques; or a system should be developed to supply trained crews/supervisors to the support vessels within the specified response time.

g. Dispersant Equipment: In addition to oil recovery equipment, dispersant equipment should be included in the contingency plan. Equipment capable of applying dispersants should be maintained at appropriate staging points as well as adequate stockpiles of dispersants if they are not readily available from local distributors. The types and toxicities of dispersants proposed for use should be identified in the contingency plan. The quantity and types of dispersants presited should be related to the risk analysis, taking into account dispersant toxicity, oil composition and water temperature. The above should not be interpreted as a predilection on the part of government for the use of dispersants, but a recognition that spills may occur when, due to environmental conditions or lack of adequate support resources, mechanical recovery is not possible. The decision to use dispersants would of course be made using the criteria and procedures set forth in the National Oil and Hazardous Substances Pollution Contingency Plan. A response target of twenty-four hours from the time the spill occurs is appropriate, unless pre-approved contingency plans or a streamlined RRT authorization procedures for the use of dispersants are in effect. In this event, the response time may be lessened.

Enclosure (2) to COMDTNOTE 5740
15 APR 1982

Addresses and phone numbers of Minerals Management Service (MMS) Contact Points:

CCGD 1	District Supervisor, North Atlantic District Minerals Management Service Mary Dunn Road Barbstable Municipal Airport/East Ramp Hyannis, MA 02601 FTS: 771-8506 COM: (617) 771-8506
CCGD 3, CCGD 5, CCGD 7	District Supervisor, Mid-Atlantic District Minerals Management Service 515 Tilton Road Northfield, NJ 08225 FTS: 483-4311 COM: (609) 641-7966
CCGD 8	Deputy Minerals Manager Minerals Management Service Offshore Field Operations 3301 N. Causeway Blvd., Suite 643 P. O. Box 7944 Metairie, LA 70010 FTS: 680-9227 COM: (504) 837-4720
CCGD 11, CCGD 12	District Supervisor, Ventura District Minerals Management Service 145 North Brent Street, Suite 202 Ventura, CA 93003 FTS: 960-6305 COM: (805) 648-5131
CCGD 17	Deputy Minerals Manager Offshore Field Operations Minerals Management Service 800 A Street Anchorage, AK 99510 FTS: 271-4303 COM: (907) 271-4303